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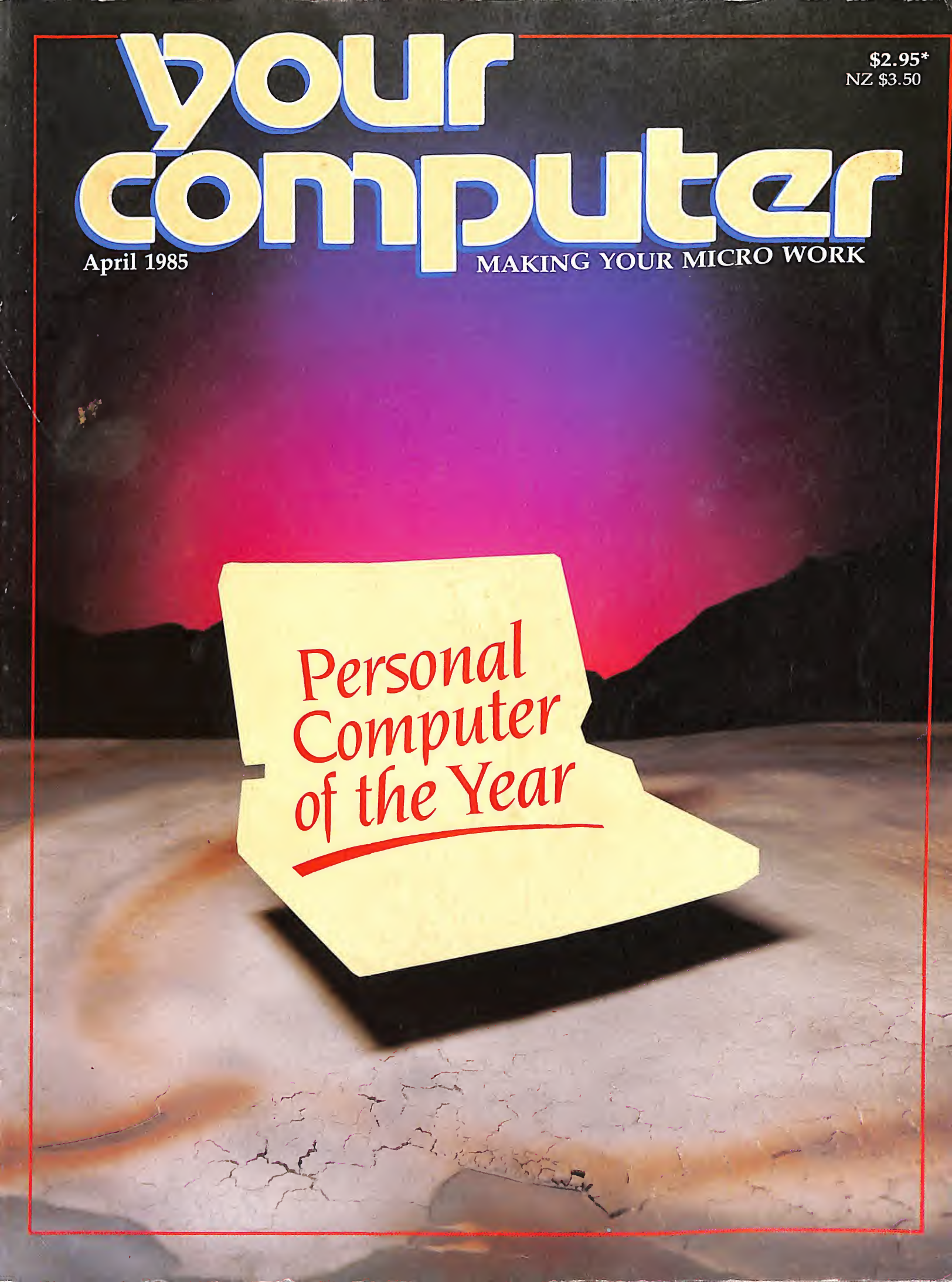
April 1985

MAKING YOUR MICRO WORK



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- Typewriter style hard keyboard.
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The John Sands Sega SC3000H Computer – including the FREE Education Course – is now available for the recommended retail price of just $349! At leading retailers throughout Australia.

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YOUR COMPUTER is published monthly by the Federal Publishing Company Pty Ltd. Printed by ESN – The Litho Centre, Waterloo 2017, phone (02) 662-8888.
Editorial and NSW Advertising: 140 Joynton Avenue, Waterloo 2017. Telex: FEDPUB AA74488.
Typeset by Frontier Technology, Spit Junction NSW; phone (02) 960-2788.
Distributed nationally by Gordon & Gotch. Registered for posting as a publication – Publication No. NBP4384. See 'Public Domain' section for information on copyright, contributions, reader services and subscriptions.
*Recommended and maximum price only.
ISSN 0725-3931.

EDITORIAL

The Computer Magazine of the Year

Welcome to the new-look *Your Computer*. After almost four years, we felt we were getting a little complacent, a little self-satisfied perhaps – and we were tired of the wallpaper. We felt like a change.

In this issue, you'll notice a number of changes. The most obvious is the layout of the pages, where we've adopted a whole new style and new typefaces – to give you a magazine that is more modern and easier to read.

You'll also see changes in the organisation of the magazine. Not all in this issue, perhaps, but over the next few months you'll certainly be aware of it.

The plan is to give you more of what you like to read; more of the stories that have set YC apart from the others in the past. One of our great strengths since the magazine's launch has been the fact we're people who *use* computers. We know how to make them work for us, and we have been able to pass that knowledge on.

Our aim is to show you how to *make your micro work* – how to get it to do what you want, when you want it. We'll show you how, no matter whether you're interested in games, utilities, or business applications.

To that end, the sections of the magazine dealing with different areas will be more clearly defined. The magazine will generally be bigger, brighter, more friendly and informative. There'll be more pocket programs – every month – to keep your computer well fed, and interesting features will keep you well read. We'll have more tutorials, and more product surveys and buyers guides. That's not the end of our plans, either – but we're not giving away all our secrets yet ...

One thing you can hardly miss in this issue is the annual Personal Computer Of The Year Awards. This year, they're even bigger and better, with some particularly interesting peripheral products making it to the list for the first time.

Altogether, there are twenty-three different products on the shortlist for the Awards – we didn't quite realise what we were taking on in evaluating that many computers and software packages! Read through our evaluations and see if you agree with the award panel.

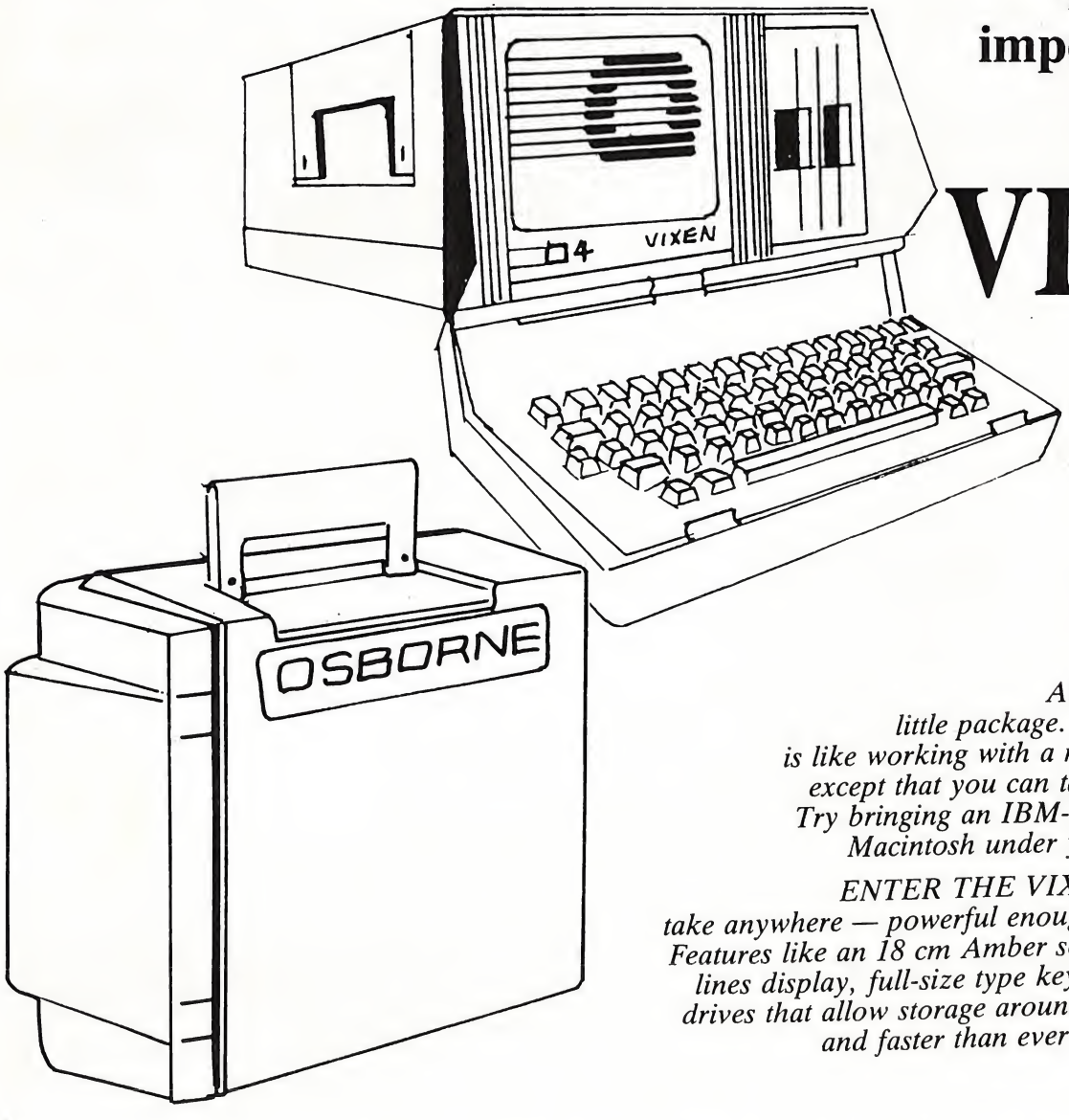
LES BELL

Cover photo: Wayne Holloway, Exposure Increase.

Imitations . . .

they may be a sincere form of flattery —
but 2nd best isn't really what you want.

The company who first introduced the portable micro has done the impossible again



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So — if you liked computers before — you'll love VIXEN.

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FINALIST AUSTRALIAN HARDWARE DIVISION Personal Computer of the Year Awards

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FOR A COMMODITIES REPORT.

FOR CONFERENCE FACILITIES CHECK.

FOR AN ON-THE-SPOT FIELD REPORT.

TO INPUT YOUR REPORT AND RECEIVE YOUR ELECTRONIC MAIL

All because of the extraordinary DataNetComm PC In/Modem... Australia's only SMARTMODEM.

INTRODUCING AUSTRALIA'S FIRST SMARTMODEM.

DataNetComm, leaders in the field of MicroComputer Communications products, have designed and manufactured the first 'Smart' modem in Australia. This is welcome news to users of IBM PC, PC XT, and PC Portable personal computers, because now you can **easily** access so many more networking systems and communications packages.

For example, now for the first time, IBM PC communications packages like CROSSTALK and RELAY, or multi-function packages like SYMPHONY or OPEN ACCESS will work properly in Australia. And indeed any other US software that uses the HAYES protocol. It all works automatically, without you having to make any adjustments.

FULLY AUTOMATIC.

The DataNetComm PC In/Modem, or to give it its full description, Asynchronous and Videotex Internal SMARTMODEM for IBM PC, gives you Auto Dialling, Auto Answer, Auto Disconnect, as well as redialling, switchboard timing, online/offline switching and Automatic speed selection. Via any telephone network your IBM personal computer can connect to most remote computers to allow you to make data base enquiries or pass information between you and your head office computer, or indeed to another micro user like yourself. Any time, day or night. **Even to a remote unattended PC.** You simply start your program and IT makes the call for you.

THE ONLY AUSTRALIAN SMARTMODEM APPROVED BY TELECOM.

The DataNetComm PC In/Modem is the first and only internally mounted "Smart" modem with HAYES compatibility to have been approved by Telecom.

We have the advantage of producing the first Australian designed and manufactured modem of its kind, and it is compatible with both Australian (CCITT) and US (Bell) standards, and **automatically** selects 300 baud or 1200 baud speeds. (You must have approved devices to connect to the Telecom phone network).

SO "SMART" IT'S WON RECOGNITION.

DataNetComm launched the PC In/Modem only late last year, (Nov '84), and already it has been a great success. We are particularly pleased that it has been judged a Finalist in the 'Best Australian Hardware Award' Section of YOUR COMPUTER 1985. And to quote the Jan./Feb. issue of Australian PC/World, "it looks set to become a landmark PC peripheral, with a number of claims to fame".

VIDEOTEX, ALL PART OF THE PACKAGE.

With DataNetComm you're not just buying a technologically advanced piece of hardware, you get a software system too. The inclusive Videotex software means you can directly access VIATEL, BULLETIN, AFTEL, ANZTEL and ELDERS IXL, and of course through VIATEL, you can access up-to-the-minute news, stock market information, horse racing odds, travel guides, telesoftware, games, business information, travel information, and through teleshopping, make bookings and other orders. You can even send a telex for for $1.75 or send electronic mail to another VIATEL user.

HOW TO GATHER A WORLD OF INFORMATION.

One of the great advantages of the DataNetComm PC In/Modem is that it is **multifunctional.** That means as well as using it to network with other PC's and Mainframes, and as well as Videotex, it links CSIRONET, DOW JONES, THE SOURCE, AUSINET, MINERVA, GEISCO, and OTC's MIDAS, plus more, at either slow or high speed.

You can receive data at 120 c.p.s. via the telephone network, internationally wherever ISD systems operate; but if you travel in the States or phone direct to the US, it will change modes to connect to the US (Bell standard) modems.

ALL YOU NEED.

If you have the following equipment then you could be in business with the DataNetComm PC In/Modem tomorrow: An IBM PC, PC XT, PC Portable (128K or above) with monitor; PC-DOS, MS-DOS or CP/M; a standard voice grade Telecom telephone line; the PC communications package of your choice.

The modem is only 13.5cm long allowing insertion behind the PC XT disk drive.

$848 is the recommended retail price of the DataNetComm PC In/Modem, including tax. With the hardware is included an Asynchronous RS232 Interface. You also get full documentation and operational manual, and the Videotex software.

AND YOU DID'NT EVEN HAVE TO PICK UP THE PHONE!

Communications has really come of age now that the DataNetComm PC In/Modem has made it easy, automatic, accessible and inexpensive to operate.

Free Trial Offer

Get your FREE diskette with full operation information on the PC In/Modem and the full range of DataNetComm MicroComputer communications products Offer expires May 31

TO: NetComm (Aust.) Pty Ltd, PO Box 284, Pymble 2073 NSW.

☐ YES I want to find out more about the DataNetComm PC In/Modem and how it will improve my networking communication facility. Rush me the FREE DataNetComm diskette immediately

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ADDRESS

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dBASE COMPILER SETS A CLIPPING PACE

When dBase III first reared its head it offered many improvements on its ultra-popular predecessor, dBase II. However, there were some areas in which the new product was a disappointment – notably speed, and that its use was restricted to IBM PCs and close compatibles. A dBase compiler has just been released which promises to ease these and other restrictions.

A US COMPANY, Nantucket Corporation, has been the first on the market with a compiler for dBase III. Called Clipper, the compiler should make life a lot easier for software developers who use dBase.

Clipper's first claim to fame is it produces programs which will run between "two and 20 times as fast" as normal dBase III applications. That's a fair range to play with, and obviously the speed improvement will depend on the type of application you're developing. It'll be interesting to see what sort of application will achieve the maximum speed improvement boasted.

The Compatibility Question

Although Clipper is currently available only on the IBM PC and close compatibles, dBase programs compiled using Clipper will run on *any* MS-DOS machine (it generates a machine language .EXE file which runs from the DOS prompt), including the NEC APC III.

It seems particularly twisted that Clipper itself *will* run on almost any MS-DOS machine. It is the copy protection system used – Softguard – which restricts the compiler's use to IBM PCs and cronies. This is what has happened with dBase III as well: the Prolok system used to protect it from being copied also stops it from being used on a wide range of machines. What a price to pay for protection from piracy!

Nantucket isn't too happy with this situation. The company is on the lookout for an alternative copy protection scheme which won't restrict the use of the product, so it's possible the situation will improve in the near future.

More Files, More Variables

Clipper offers a variety of other improvements over dBase III. You may have 250 files open at any time (compared with dBase III's 15) and there is allowance for 64,000 memory variables and fields. A vast improvement.

All typical dBase III program commands are supported, including macros. There is also support for the use of macros in DO WHILE loops, something Ashton-Tate warns against in dBase. Linkage to separately compiled or assembled programs in any language is possible through the CALL command.

Nantucket also claims Clipper reduces program size; the .EXE files produced are half the size of the original dBase .PRG command files *plus* an average of 64 Kbytes. Whether this means a 2 Kbyte .PRG file will convert to a 65 Kbyte .EXE file is unclear. But if you're producing programs over 128 Kbytes in length you should get some benefit.

Prolok Comes Unstuck

Version 1.1 of dBase III has also been released. You won't find any changes in the program itself to make it worth dashing out and buying. The main difference between this and the original version is the copy protection system used. Ashton-Tate has abandoned Prolok and is now using Softguard.

Prolok has been the object of considerable criticism, as it requires the master disk to be in the disk drive whenever a Proloked program is fired up. This procedure seems to tempt fate a little too much for most people's liking, with the chance of destroying your master disk ever-present. Softguard works by taking the contents *from* your master disk and transferring them to the hard disk. It'll be interesting to see if it's any more palatable than Prolok.

Arcom Pacific is the distributor for Clipper and dBase III in Australia. Clipper retails for $999. Contact Arcom for more details: 252 Abbotsford Road, Mayne, 4006; (07) 52 9522. □

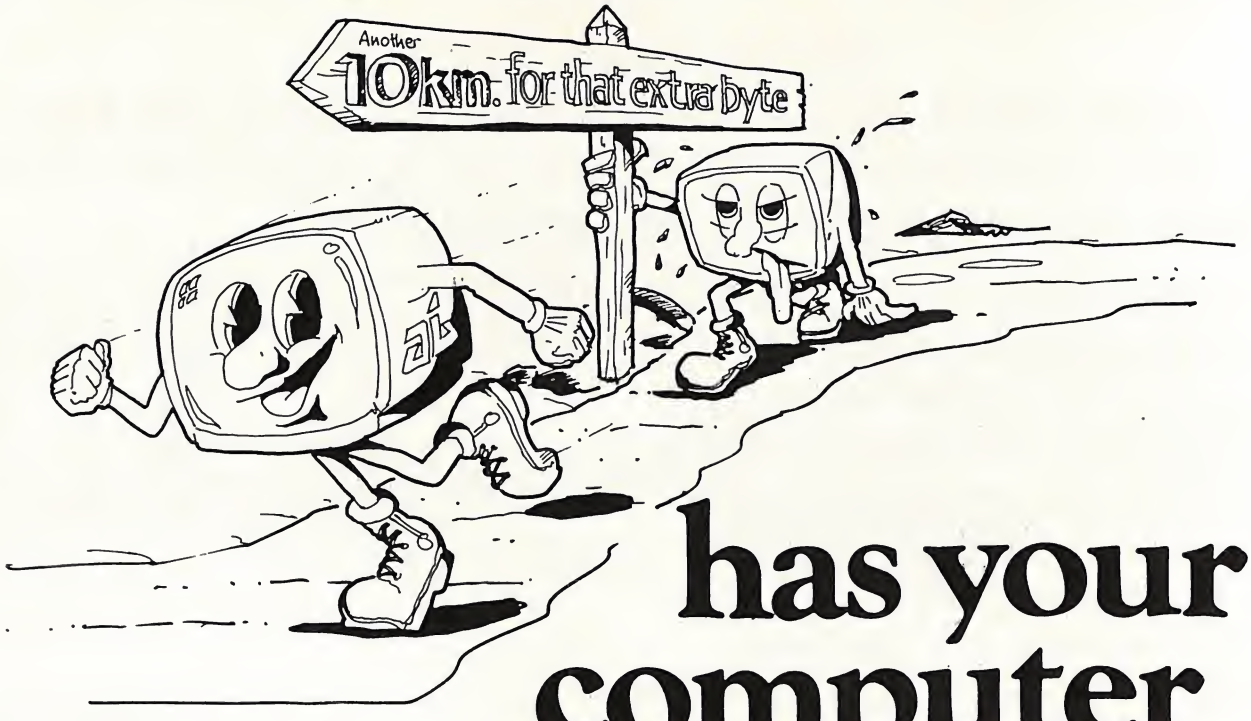
FATMACS ON CAMPUS

The Computer Science Department of the University of Western Australia has taken delivery of 40 Macintosh computers (all 'FatMacs', with 512 Kbyte RAMs) for use in its first year Computer Science Laboratory. Coupled with the four machines the university bought in 1984, this makes it the largest Macintosh lab in Australia.

Previously, students were using terminals connected to a PDP11/Cyber combination, which allowed interactive editing of programs, but forced them to be run in batch mode. With the Macs, students will get a scheduled two hours per week at the computer.

Professor Jeff Rohl, of UWA's Computer Science Department, is enthusiastic about the Macs. "The Macintosh Pascal is pure magic: it automatically indents a program as it is entered; it puts keywords in bold face; and it highlights any invalid construct. It is an interpreter which can run a program step by step, can be interrupted at any time, and allows break points . . . Macs are without doubt the way of the future."

Although students and staff have absolute priority on the machines, the department intends to make them available to the public during the evenings, weekends and vacations under a Community Computing Program to be announced shortly. □



has your computer run out of puff?

Sooner or later most micro computers run out of puff.

The Labtam 3003 Desktop computer was specifically designed with more **puff** in mind. The Labtam 3003 has a standard configuration which includes:

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Designed and manufactured in Australia, supplied to the world

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SYNERGISTIC BEER DRINKING

Synergistic beer drinking? Yes indeed. The staff of *Your Computer* has decided to introduce a custom Les Bell made popular when he was editor of *Electronics Today International*. From May 1 we will be retiring after work to the Clock Hotel, Surry Hills, Sydney, every first Wednesday of the month. We invite you, our readers, to join us for discussion, debate, sharing of ideas and a drink or two. In this way we hope to get feedback about how you think the magazine is going, what are the good and bad features, and what you'd like to see in the future. It'll also give us a chance to share information and swap ideas.

The gatherings will be entirely informal – if you feel like coming along, just turn up at the Clock (470 Crown Street, Surry Hills) at 6 pm or so on May 1 or any first Wednesday of the month after that. You should be able to recognise us by the magazines on the table and our general air of fanaticism and wisdom.

□

RURAL COMPUTER SHOWS

A series of exhibitions of computer hardware (and some software) will tour New South Wales country centres from July to August this year. The 30 exhibitors will include Apple, Olivetti, Sanyo, Wang, IBM and AWA.

The exhibition will give country people a rare chance to have face-to-face contact with manufacturers and suppliers. The organisers, Country Computer Exhibitions, hope to attract interest from local government, education, chambers of commerce, service clubs and the rural sector.

Dates and venues for the tour are: Albury-Wodonga, June 7-9, Wodonga Stadium; Wagga, June 14-16, Mt Austin High School auditorium; Griffith, June 21-23, Woodside Hall, Showground; Parkes, June 28-30, Police Boys' Club; Orange, July 5-7, Ex-Serviceman's Club; Dubbo, July 12-14 (venue to be advised); Tamworth, July 19-21, Tamworth Town Hall; Port Macquarie, July 26-28, Port Macquarie High School auditorium; Coffs Harbour, August 2-4, Coffs Harbour Town Hall; Lismore, August 9-11, Churchill Centre.

If you'd like more information about the exhibitions, contact: Hartley Henderson, (02) 797 6646 or (02) 516 5866.

□

PC-SLAVE RELEASED TWICE

In February, two companies released a new enhancement for the IBM PC, XT and compatibles, which offers a cheap and efficient multi-user capability. PC-Slave lets you add 31 additional terminals to a single PC.

The PC-Slave card contains its own 8 MHz 8088 processor (almost twice as fast as the IBM processor), 256 Kbytes of RAM and two serial ports. Because each slave terminal has its own processor there is no system degradation; in fact, the slave terminals work faster than an IBM PC host.

Software for the system is the Real-Time Network Executive (RTNX), which handles selective and total file locking, record locking, sharing of all peripherals, spooling, remote execution of programs and simple electronic mail facilities.

In the US, Alloy Computer Products has distribution rights for PC-Slave on the East Coast, while Advanced Digital Corporation has the West Coast rights. In Australia, Alloy and Archives are both distributing it in the same geographical market. Archives believes its expertise in multi-user systems will enable it to fully support the PC-Slave. For Alloy, PC-Slave will extend the range of peripherals offered by the company; Alloy will also be selling complete systems, including the PC host.

Both companies are retailing the Slave for $2995, including tax. The price tag includes a slave terminal and keyboard, Slave card, connecting cable and the RTNX software. For details, contact: Alloy – (03) 51 5278 or Archives – (02) 922 3188. Both companies have offices in other states.

□

LAN CONFERENCE FOR CANBERRA

The Canberra branch of the Australian Computer Society is holding a conference on local area networks on May 1 and 2. LANCON '85 will focus on users' experiences in the acquisition and use of LANs, progress in the implementation of Levels 2 and 3 of the ISO OSI (International Standards Organisation Open Systems Interconnect) hierarchy, and the interplay between LANs and third-generation PABX.

The main speaker at the conference will be Mr Mike Roberts, the managing director of Australian manufacturers Time Office Computers. Other speakers will include users from both the government and private sectors.

Registration fees are $120 for ACS members, $150 for non-members and $70 for ACS student members. For more information, phone (062) 88 8048.

□

SCHOOL LIBRARY AUTOMATION CONFERENCE

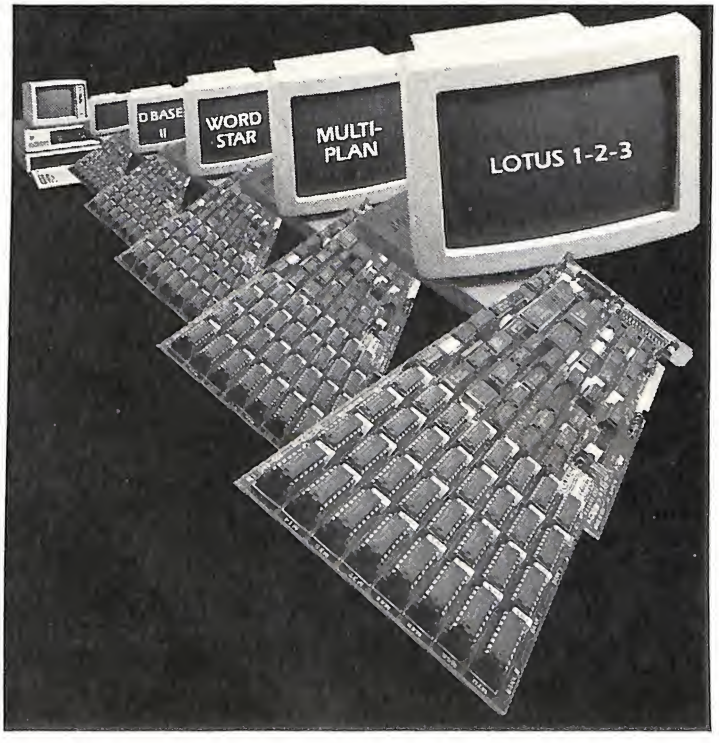
The Department of Library Studies at the Western Australian College of Advanced Education is holding a two-day conference on 'School Library Automation' in Perth on April 12 and 13.

Speakers will discuss computer applications in school libraries, local school library computing projects in progress, ASCIS (Australian Schools Catalogue Information Service), selecting computer software, computer hardware considerations, management of computer resources and likely future developments in school library computing.

Selected computer hardware and software vendors will be demonstrating their ranges of educational and library management products during the conference, and there will also be a display of computer-related books and other materials.

The venue for the conference will be the Nedlands Campus of the WA CAE. Further information may be obtained from: Dr Anne Clyde, Head, Library Studies Department, WA College of Advanced Education, Cnr Stirling Highway and Hampden Road, Nedlands, 6009; (09) 386 0222.

□



What makes Macintosh tick. And talk.

The brain of the Apple Macintosh uses a blindingly fast 32-bit MC680000 microprocessor. Far more powerful than the 16-bit 8088 found in current generation computers.

The 16-bit 8088 microprocessor.

Macintosh's 32-bit MC68000 microprocessor.

The heart is a revolutionary technology of windows, icons, pull-down menus and mouse-commands.

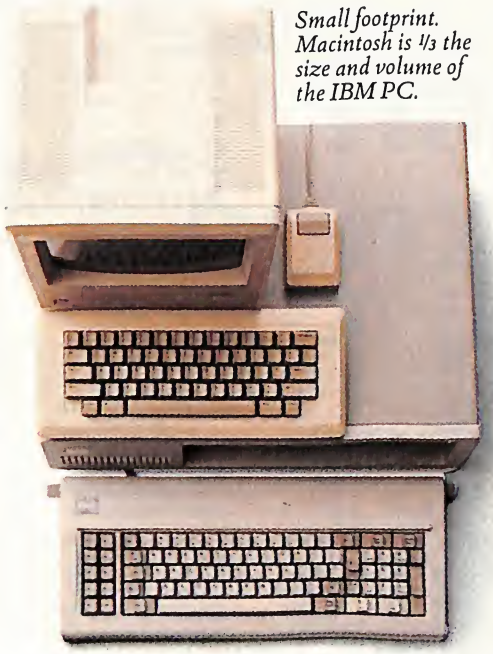
Which makes the 32-bit power not only more useful but easier to learn.

Another miracle of miniaturisation is Macintosh's built-in 90mm (3½") microfloppy disk drive. Its 90mm disks store more than conventional 135mm (5¼") floppies – 400K. So while they are big enough to hold a desk-full of work, they are small enough to fit in a shirt pocket.

Standard 135mm (5¼") floppy disk.

Macintosh's 400K 90mm (3½") disk.

And, thanks to its size, if you can't bring the problem to a Macintosh, you can always bring a Macintosh to the problem. (Macintosh actually weighs less than 9 kilos.



Small footprint. Macintosh is ⅓ the size and volume of the IBM PC.

And speaking of talking, Macintosh has a built-in polyphonic sound generator capable of producing high-quality speech or music.

All it takes to get it talking is special Macintosh speech generating software.

On the back of the machine, you'll find built-in high speed RS232 and RS422 AppleTalk/ serial communication ports. Which means you can connect printers, modems and other peripherals without adding $250 cards.

It also means that Macintosh is ready to hook into a local area network. (With the AppleTalk Personal Network, you'll be able to connect up to 32 computers and peripherals.)

Should you wish to double Macintosh's storage with an external disk drive, you can do so without paying extra for a disk-controller card – that connector is built-in, too.

And, of course, there's a built-in connector for Macintosh's mouse, a feature that can cost up to $500 on computers that can't even run mouse-controlled software.

Of course, the real genius of Macintosh isn't its serial ports or its polyphonic sound generator.

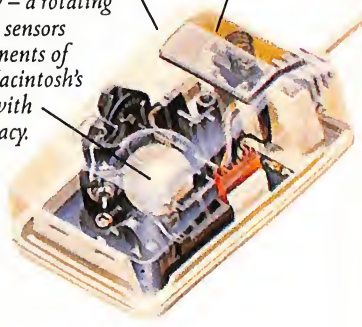
The real genius is that you don't have to be a genius to use Macintosh.

You just have to be smart enough to buy one.

Some mice have two buttons. Macintosh has one. So it's impossible to push the wrong button.

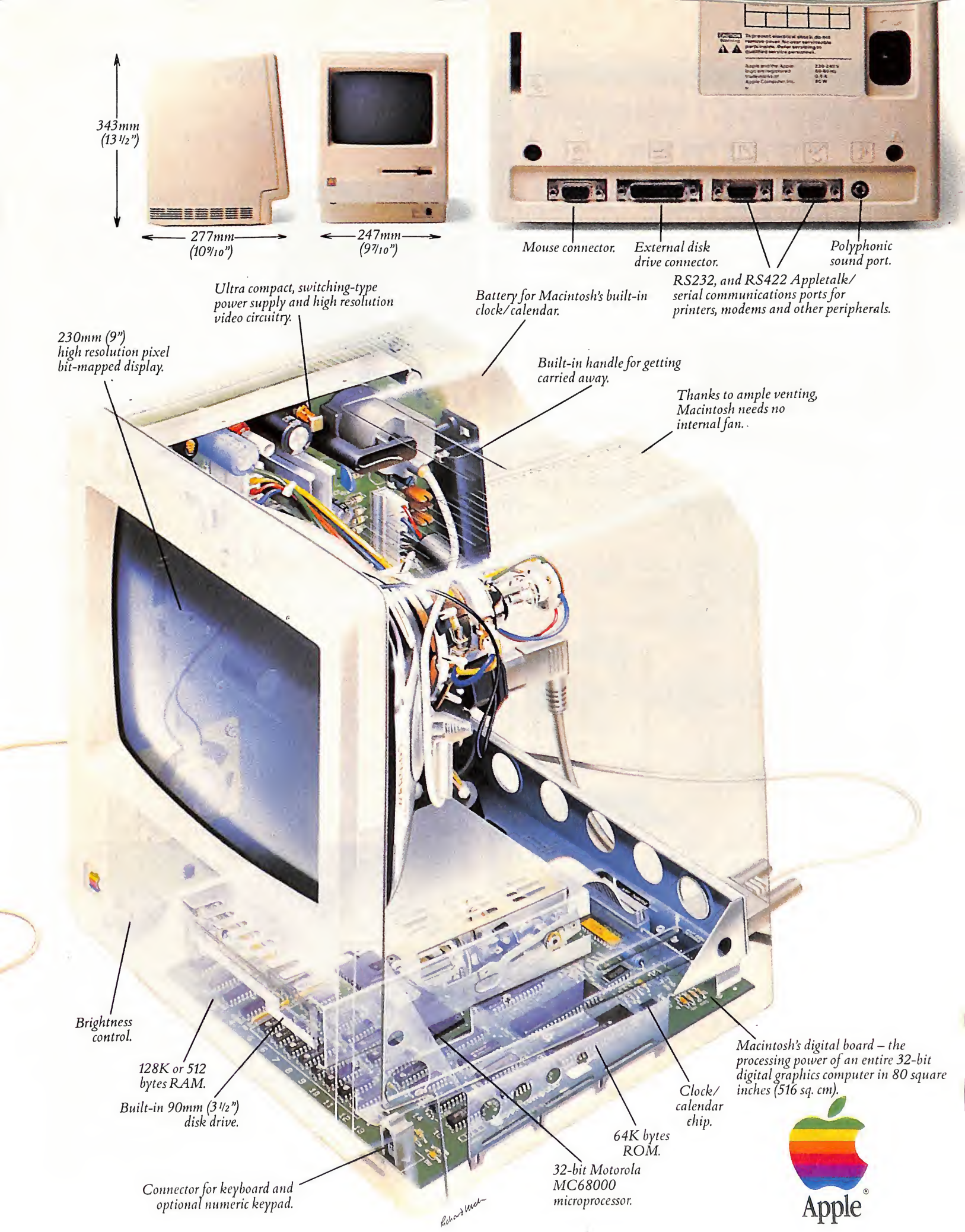
The Mouse itself. Replaces typed-in commands with a form of communication you already understand – pointing.

The inside story – a rotating ball and optical sensors translate movements of the mouse to Macintosh's screen pointer with pin-point accuracy.



Apple credit card available at participating dealers.
For your nearest Apple dealer, outside Sydney call toll-free (008) 221555 or Sydney 908 9088.

AP140/Palace


343mm (13 1/2")
277mm (10 9/10")
247mm (9 7/10")
Mouse connector.
External disk drive connector.
Polyphonic sound port.
RS232, and RS422 Appletalk/ serial communications ports for printers, modems and other peripherals.
Battery for Macintosh's built-in clock/calendar.
Ultra compact, switching-type power supply and high resolution video circuitry.
230mm (9") high resolution pixel bit-mapped display.
Built-in handle for getting carried away.
Thanks to ample venting, Macintosh needs no internal fan.
Brightness control.
128K or 512 bytes RAM.
Built-in 90mm (3 1/2") disk drive.
Connector for keyboard and optional numeric keypad.
32-bit Motorola MC68000 microprocessor.
64K bytes ROM.
Clock/ calendar chip.
Macintosh's digital board – the processing power of an entire 32-bit digital graphics computer in 80 square inches (516 sq. cm).
Apple

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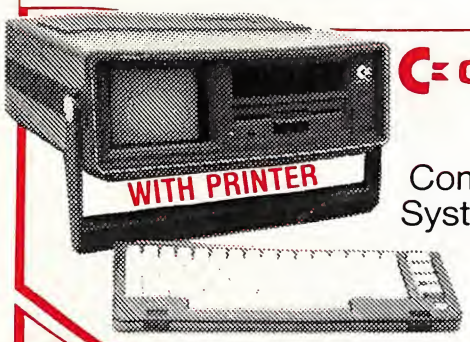

C= commodore
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1984 Arrives a Little Late

"Read any good minds lately?" So runs the advertising for Human Edge's latest and cutest offering, 'Mind Prober'. Mind Prober will "let you read people like a book and discover things about them that most people wouldn't dream of telling you."

Described as an 'expert system', Mind Prober leads you through a series of assessment questions about your victim (sorry, "user's counterpart") and develops a printed report telling you how that person copes with stress and behaves in relationships, their attitudes towards work and sex, and their personal interests.

Human Edge claims this personality profile is "so accurate, it's frightening". The publicity continues: "You'll know what makes your subject tick. And that's a tremendous advantage in figuring out how to get what you want from someone ... pick up a Mind Prober today and get a piece of someone's mind".

If this sounds appealing, you can buy Mind Prober for $49.95 (for the Commodore 64) or $69.95 (for the IBM PC, Apple II and Macintosh). It might just tell you more about yourself than your 'subjects'. Contact Human Edge for more details: 63 Stead Street, South Melbourne 3205, or phone (03) 690 5014. □

Sperry Moves into Qld Schools

Sperry, a major supplier of mainframes to the Queensland Government, has won a Department of Education contract to supply personal computers to Queensland schools.

The tender is part of a $7.5 million project by the state government to install computers in all Queensland secondary schools over the next three years. All the machines will be used in the classroom in a computer literacy program which will cover keyboard skills, database, spreadsheet and word processing applications, and elementary technical computations.

The first 1400 computers will be installed over the next few months. Schools will be supplied with networks of between five and 30 micros, depending on the school's size and operation. The computers are 16-bit MSDOS machines, and Queensland software company Arcom Pacific will be supplying a number of well-known commercial software packages to run on the machines. Sperry will also be supplying a printer sharing device, the Lipton T-Switch, manufactured by Gold Coast firm Lipton and Whyte. □

Share the Load

Computermax is distributing a low-cost intelligent switching device from SciSys. The Serial Printshare lets a number of terminals or computers share facilities, or provides flexibility for a single computer needing more than one serial peripheral.

The Printshare has a built-in 64 Kbyte buffer, which decreases or eliminates time spent in waiting for the printer to be free, and a copy facility for automatically producing multiple copies of documents. It is supplied with necessary cabling and retails for $499 (including tax). Computermax can be contacted at 539 Pittwater Road, Brookvale 2100; (02) 93 1383.

Bob's the Name

In our review of 'The Australian Guide to Lotus 1-2-3' (*Your Computer*, January 1985) we gave credit for authorship to Owen Bishop.

It's not true; our apologies to Bob Thompson, who wrote the book. The price quoted for the Guide and diskette – $24.95 – was a special introductory offer which is now out-of-date. The current price is $29.95, and you can get a copy from Bob's company: Computer Tutor, 17 Mountview Ave, Parkdale 3195, (03) 580 3480. □

IBM IN THE CLEARINGHOUSE

The Royal Melbourne Institute of Technology has announced that IBM will display products at its Australian Microcomputer Industry Clearinghouse (AMIC).

AMIC started operations in 1984, providing information and independent advice to users and buyers interested in a range of local and overseas microcomputers. People can test and evaluate all the hardware and software on display. AMIC also conducts demonstrations and provides consultations and training courses.

Companies already involved with AMIC include Apple, Control Data, Digital, Hewlett-Packard, ICL, Insystems, Tandy, Labtam, Hartley and Case. AMIC's manager, Peter Wilkinson, believes IBM's support will increase the number of people using the Clearinghouse, and encourage involvement from other computer companies.

AMIC is at the Gateway Plaza, 449 Swanston Street, Melbourne. For further information contact Peter Wilkinson on (03) 348 1775. □

COMPUTER-AIDED CIRCUIT DESIGN

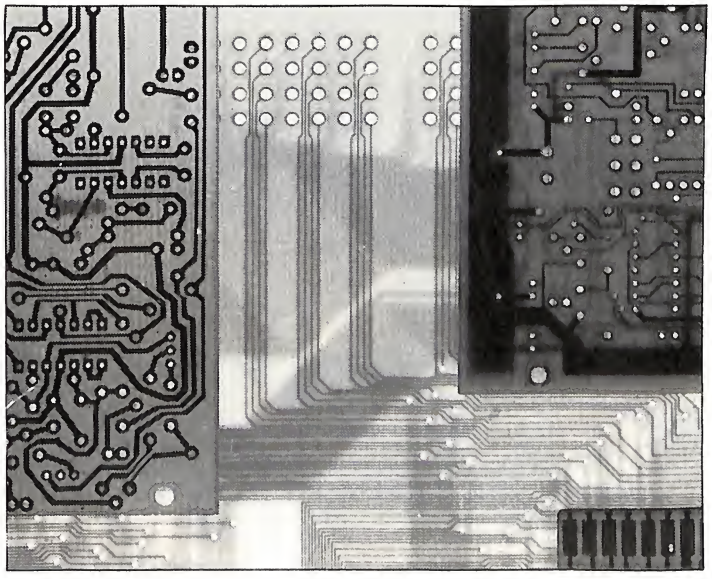
An Auckland company, New Technology Ltd, has become the agency for Analyser, a linear circuit analysis program for the BBC model B microcomputer (and soon available on other computers).

The program was originally written for internal use by Number One Systems, an English consultancy specialising mainly in solving analogue and interface design problems. The staff's enthusiasm for the program led it to offer it for general use.

The Analyser is designed to simulate resistors, capacitors, inductors, transformers, bi-polar and field-effect transistors and operational amplifiers, in any combination. The circuit may be analysed in terms of input impedance, output impedance, gain and phase. Circuits of 16 nodes and 60 components can be analysed.

Using the system it is possible to alter information and parameters and judge the results without the risk of blowing everything up or spending an inordinate amount of time breadboarding. Modifications can be made to the circuit configuration and component values as required and the analysis re-run, enabling the designer to quickly assess the circuit sensitivity to component tolerances, temperature and other effects.

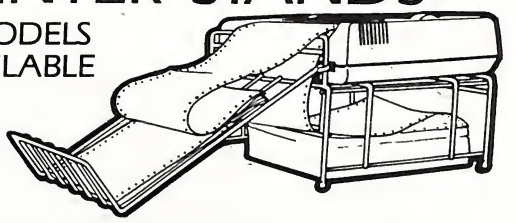
The program is supplied on cassette and costs NZ$125 or A$75 (including postage and packaging). It's available from: New Technology Ltd, PO Box 5066, Wellesley St, Auckland. □



Paper Tamer

PRINTER STANDS

2 MODELS AVAILABLE



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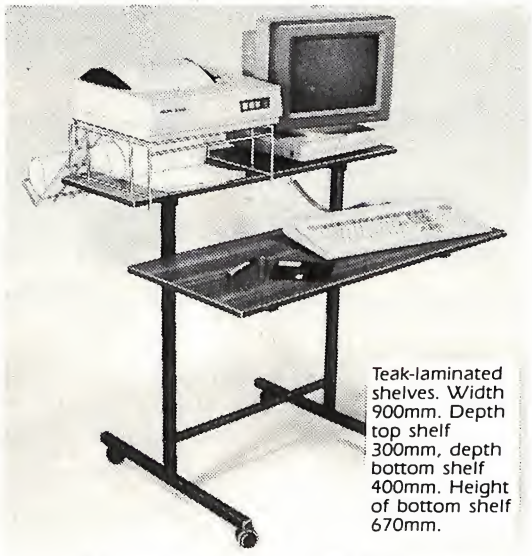
PLEASE NOTE: Photograph shows Budget Desk with PT1 Paper Tamer.



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	PT1 80 col. suits 210mm (8¼") paper	$49.95	
	PT2 136 col. suits 380mm (15") paper	$59.95	
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DEALER ENQUIRIES WELCOME

BRIEFLY

☐ PC-Paintbrush lets you do things on your IBM others do on their Macintosh. Based on an icon menu, you can use this program (in conjunction with a hardware colour card) to draw free-form graphics with a mouse or joystick. It costs $199 and you can get more details from: Sourceware, 4/73 Albert Avenue, Chatswood, 2067; (02) 411 5711.

☐ Learn Morse code on your Microbee. Morse Course from High-Tech Tasmania comes on cassette and costs $18.50 including postage. For more information or to order, contact: High-Tech Tasmania, 39 Pillenger Drive, Fern Tree, 7101.

☐ If you're an owner of an Excalibur 64 you may not be aware there is an active users' group in existence for persons of your ilk. The Excalibur 64 Users' Group recently combined with the Sorcerer and CP/M group. Contacts for the group are: Victoria (03) 386 2350, WA (09) 325 4409; NSW (02) 46 1976; ACT (062) 58 4591; SA (08) 255 7123.

☐ Management Technology Education is conducting two consecutive two-day courses on 'Getting More out of CP/M' and 'Mastering PC-DOS, MS-DOS'. Sydney dates are April 11th-12th and 15th-16th, Melbourne April 18th-19th and 22nd-23rd. Both courses will be presented by our very own Les Bell. More information from Ian Rooney on (02) 290 3555 (interstate callers use the toll-free number (008) 22 4514).

☐ Hewlett-Packard has released a laser printer, the LaserJet, which will sell for $4690 (excluding tax). It can print eight pages per minute with a 300 by 300 dot per inch resolution. The LaserJet will work with the HP 150 Touchscreen, IBM PC and IBM compatibles. Contact Hewlett-Packard for details (03) 895 2895. ▷

☐ Industry sources believe the IBM Wangaratta plant will ramp up production to around 30,000 by the end of 1985. This will represent about $95 million in sales for the company – about one-sixth of the ◁ projected Group annual turnover.

☐ The Arbitration Commission has endorsed an agreement for wide-ranging studies to be conducted by the Public Service on eye testing and visual display unit radiation. The agreement also asks the National Health and Safety Commission to examine urgently the standards and arrangements which should apply to testing of radiation emission, especially in relation to potential birth deformities and miscarriages.

☐ IBM Australia has awarded its Personal Computer Dealer of the Year award to B.S. Microcomp of Melbourne. The award is made on the basis of sales performance, customer satisfaction judged on independent surveys, and participation in IBM-sponsored dealer activities.

☐ The University of NSW will broadcast a two-part course on FORTRAN 77, starting on April 17. It's a beginner's course which requires no programming experience and no maths beyond School Certificate level. Each lecture will be broadcast in the Sydney area at 7 pm on Wednesdays and again at 8 pm on Fridays over the University's radio station, 2UV. Course fees are $25 per part. For more information: (02) 697 3175.

☐ The Short Half for the IBM PC (including the portable) enables owners to use the short expansion slots for add-on memory, saving the scarce long slots for other boards. In order to fit half a megabyte in such a small space the designer, Fourth Generation Systems, has used the new 256 Kbyte dynamic RAM chips. The board also has a standard IBM printer port. Details from: Fourth Generation Systems, (09) 321 3330.

☐ Microsoft's new Macro Assembler supports the entire range of Intel 16-bit microprocessors, working with the 80186, 80286 and 80287, in addition to the already supported 8086, 8087 and 8088. MS-DOS 2.0 and 128 Kbytes RAM are required to run the Assembler. Suggested retail price is $275, with an upgrade from the earlier release costing $75.

☐ February saw the release of the Ericsson PC, yet another IBM compatible. Ericsson is offering a three-year warranty on the computer, which it hopes will make it stand out from the crowd of compatibles. It's good to see some manufacturers offering buyers a reasonable deal on warranties.

☐ Twinlock Australia has released a wrist support which it claims will make working at a keyboard more comfortable. The support can be attached to any table or workstation, and has adjustable brackets. For details: (03) 584 4000.

FINALIST

SOFTWARE PRODUCT OF THE YEAR 1985

your computer MAGAZINE

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LONDON LETTER

BY MARTIN HAYMAN

New Players in the Game

These are stirring times in Britain for anyone involved in home computers. As the dust settles over the pre-Christmas sales drives, when over 70 per cent of total production is sold, the message is clear that UK manufacturers, who for the last three years have had things pretty much their own way, will have to try harder to hang on to their profits and beat off the threat of imported machines.

In the UK, the home computers which made the best showing during 1984 were Sinclair, Acorn and Commodore. But a new maker, Amstrad, has done well with its CPC 464, a value-for-money, everything-in-the-box machine designed in Britain and assembled in the Far East. Amstrad made its reputation with cheap but solid audio equipment and its home computer has that air of good packaging and high reliability which is characteristically Japanese.

So far the Japanese MSX machines, which bring the 'personal hi-fi' look to computers, have not got off to a good start here. The reason is their pricing has been wrong. But now prices are starting to fall, with Mitsubishi, Toshiba and Goldstar all cutting retail prices. How they can do this when sterling has sunk to an all-time low of $US1.10 merely illustrates the kind of profit margin there is in electronics products.

Though the MSX standard has been criticised by UK manufacturers as "too little, too late" it is nevertheless expected to be a 'grower'. MSX is not technically innovative, but the joint effort put into making the specification functionally compatible across a variety of manufacturers' products will surely turn out to be worthwhile in the long term. When the clever peripherals like music, video, graphics and TV controllers start to appear in quantity, MSX may prove to be irresistible, especially for the customer who just wants to take the product out of the box and start using it. There are plenty such customers, and it is they who have put the Amstrad in among the best sellers.

Tramiel Shows His Style

The unwelcome signs of real competition from the Far East are not the only threat to Sinclair and Acorn. Commodore and Atari, their traditional Stateside competitors, are in the throes of a giant grudge match and the UK, as one of the most thriving sales markets, is high on both companies' lists of priorities. A recent putsch at Commodore saw the boss, Jack Tramiel, ousted from the top job. Tramiel is a born fighter and has been knocked down several times before. True to his formidable reputation, he got up off the floor, bought out the ailing Atari group from Warner Brothers and instantly set about the drastic reorganisation which had made him hated and feared by his opponents.

He fired 75 per cent of Atari's staff and drew up a complete program of new model launches for 1985. Just before Christmas he paid a flying visit to London to announce these new products and the audacity, scope and scale of his plans was breathtaking. Looking very like Marlon Brando playing the Godfather, Tramiel has, despite his short stature, enormous physical presence and the way he handled some surprisingly aggressive questioning by reporters was masterly.

Though Tramiel's policy is to cut unnecessary expenditure to the bone, he is not afraid to spend money in the cause of efficiency either – when he was at Commodore, the 64 model reputedly cost as little as $US16 to manufacture. He will have a new factory built, probably in the state of Nevada where taxes are more favourable. Tramiel reckons he can now get computers built more cheaply in the US than in the Far East.

Diminishing Returns Cause Price Cuts

Whatever his secret is, British manufacturers would like to know it. If Tramiel's Atari delivers what is promised, then the Brits as well as Commodore could be in for a very rough ride. For one of the biggest problems with the UK breed of home computer is its excessive price of manufacture.

Acorn is still selling its BBC Micro, still with its puny 32 Kbytes of RAM, at the hefty price of 399 pounds. The BBC Micro is officially approved for purchase by schools and since 1981 Acorn has made a good living selling this machine. But cuts in educational budgets could hit sales of this computer, and in the meantime Acorn has had to cut the price of its consumer home computer, the Electron, by a whopping 35 per cent. Acorn, which went public last year, has seen its stock market valuation slump from a high of 218 million pounds a year ago to a low of 55 million pounds, prompting Acorn boss Chris Curry to lash out at "an orchestrated campaign to run down the British computer industry in general and Acorn Computer in particular."

Even Sinclair has not been immune. Sinclair did well over the Christmas period, not least because there is so much games software available for the mainstay of the range, the Spectrum. Home computers are increasingly being sold simply as games machines – parents have seen through the rhetoric of the home computer as an educational device. But this does mean there must be a price ceiling. A games machine should cost significantly less than a video recorder.

Growth in the UK market has fallen from its peak of over 100 per cent in 1983 and is predicted to fall to less than one-third of that. The spectre of over-capacity lurks in the wings. Hence Sinclair, like Acorn and Commodore, has been obliged to cut the price of the Spectrum Plus for 1985. In the meantime, the Sinclair QL, a year after its launch, has still not gathered the software base which has made the Spectrum such a runaway success. Critics blame the decision to stay with Sinclair's unique microdrives rather than offering Sony-type 9 cm microfloppies.

Sir Clive has been personally visible over the Christmas period. He has at last launched his pet project, the C5 electric 'car' – a sort of fibreglass bathchair, powered by an electric motor from a washing machine, which will be serviced by Hoover agents. Power output is so puny the three-wheeled device must be supplied with pedals to make it uphill. With the whole thing weighing in at 54 kg and a range between recharging stops of only 64 km, wouldn't you be better off with a regular pushbike, asked the critics? The whole first production run of several thousand has, however, been snapped up – most of them, it seems, by holiday camps.

Fists Fly in Home Computer Wars

On a personal note, Sir Clive was lately divorced from his wife Ann, who until recently was a named director of Sinclair Research. Perhaps the strain was telling when, in an incident in a pub in Cambridge, Sir Clive came to blows with Acorn boss Chris Curry. The two men know each other well, of course – Chris used to be Clive's right-hand man in the days of Sinclair Radionics before he left to set up Acorn.

Apparently the fracas ensued when Sir Clive strode into the bar of the Baron of Beef public house in Bridge Street, where Curry was entertaining his staff to a few pre-Christmas drinks. Sinclair was brandishing an Acorn poster which contained the implication that Sinclair's home computers were less reliable than Acorn's. Since the respective firms' Christmas advertising campaigns are both estimated to have cost around 4.5 million pounds, quite a lot of earnings were riding on the publicity material.

An unseemly brawl ensued in which Sinclair lashed his former lieutenant around the head with a rolled-up copy of the offending poster in front of his astonished colleagues. Heated discussions continued later in the evening in one of Cambridge's less salubrious watering holes. It appears the two men, honour satisfied, have now made up their differences and are closer once again. Computing does have its lighter moments.

□

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AND THE WINNER IS . . .

BY LES BELL

Hewlett-Packard's HP 110 is the 1985 Personal Computer Of The Year, the worthy winner of a tough battle against eight machines our judges considered the cream of the past year's releases.

It knocked out six of the best in the finals before taking on the Apple Macintosh – little brother to the then-reigning PCOTY champ, the Lisa – and Olivetti's hotshot IBM-beater, the M24, in the ultimate showdown.

The Mac, carrying much of the innovative technology which won Lisa its title, and the M24 – one of the few high-speed IBM-beaters which is truly compatible – made it a hard decision all the way.

But in the end it was Hewlett-Packard's day; it was the class portable of a year in which portables 'arrived'. As the Award specifies, it was the machine which represented the greatest step forward in the state of the art . . .

The Long Road To Victory

Deciding on a winner in each Award category from such a selection of excellent products isn't easy, but the judges had to do it. The year wasn't an outstanding one for innovation; rather, it was one in which old themes were refined and made more appropriate to people's needs.

The title of Personal Computer of the Year is only one category of the Awards, as *Your Computer* recognises the equal importance of software in the use of microcomputers. Altogether the Awards comprise:

The Personal Computer Of The Year Award: awarded to the personal computer, released on the Australian market in the last calendar year, which represents the greatest step forward in the state of the art.

The Software Product Of The Year Award: awarded to the software package, released on the Australian market in the last calendar year, which represents the greatest step forward in the state of the art.

There are also two Special Commendations:

Australian Hardware: awarded for Australian achievement in hardware design, support and marketing.

Australian Software: awarded for Australian achievement in software design, support and marketing.

It is important to recognise that the Awards and the Special Commendations serve different purposes. The main PC and software Awards are primarily decided on technical excellence, product support, utility and other criteria, with little attention paid to success in the market. This is because newly released products may only recently have appeared on the market and barely started to sell.

The Australian commendations differ in two major ways: first, they consider, not products released in the last year, but machines (or software) which have achieved notable success in the last year, either commercially, or in terms of software support, upgrades, technical excellence or, in particular, export success.

Criteria for Judging

The major criteria – not in any particular order – which the panel used in judging the machines were:

- ☐ Ergonomic design, in terms of both hardware and software.
- ☐ Technical excellence in design and engineering, and provision of advanced or new features.
- ☐ User support, documentation and training.
- ☐ Value for money.
- ☐ Performance.

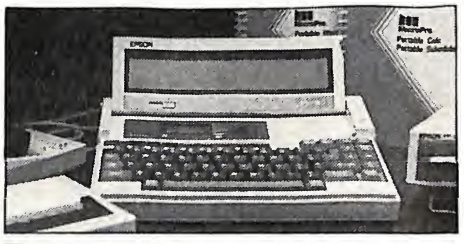
However, the Award panel doesn't feel constrained to consider only those criteria. With the current rate of development, a machine could be released which 'breaks all the rules', and although deserving of the Award, would not score well against the literally 'prejudiced' criteria.

The Finalists

The Personal Computer of the Year Award shortlist eventually emerged after long discussion, and the nine machines represent the cream of the year's crop. Each is a leader in its own market segment, and it was obvious that choosing a winner would be no easy task. Here is the official shortlist:

■ Apple Macintosh

■ Dick Smith Electronics Bondwell 14



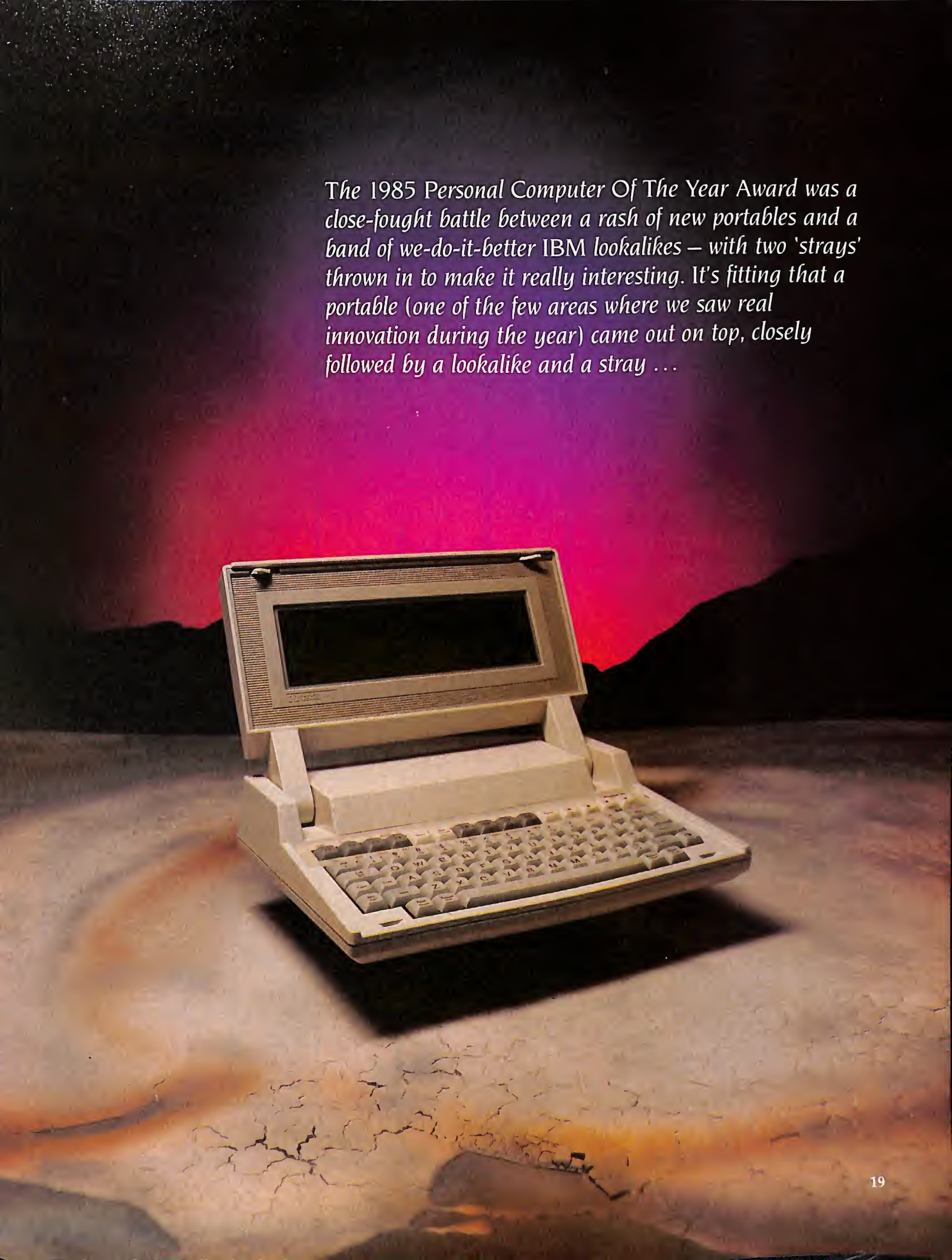
■ Epson PX-8

■ Hewlett-Packard 110 ▶

■ NEC APC III

PIC: WAYNE HOLLOWAY — EXPOSURE INCREASE

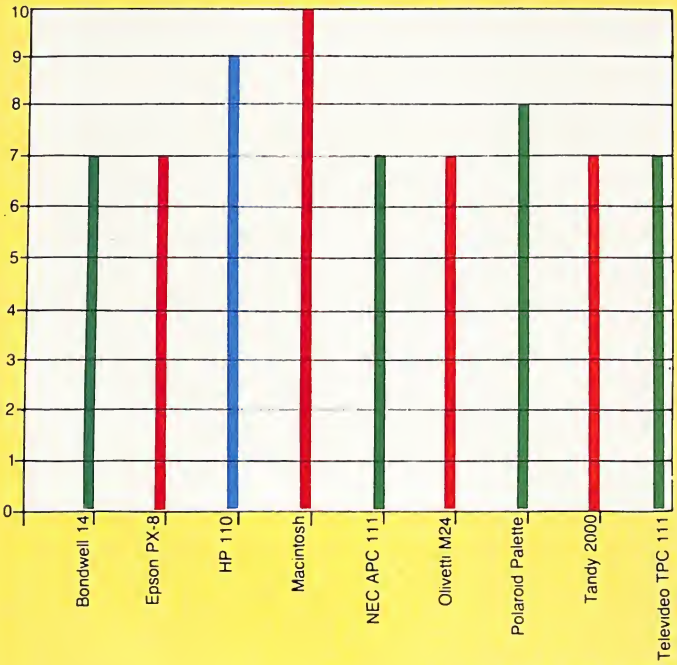
The 1985 Personal Computer Of The Year Award was a close-fought battle between a rash of new portables and a band of we-do-it-better IBM lookalikes – with two 'strays' thrown in to make it really interesting. It's fitting that a portable (one of the few areas where we saw real innovation during the year) came out on top, closely followed by a lookalike and a stray ...

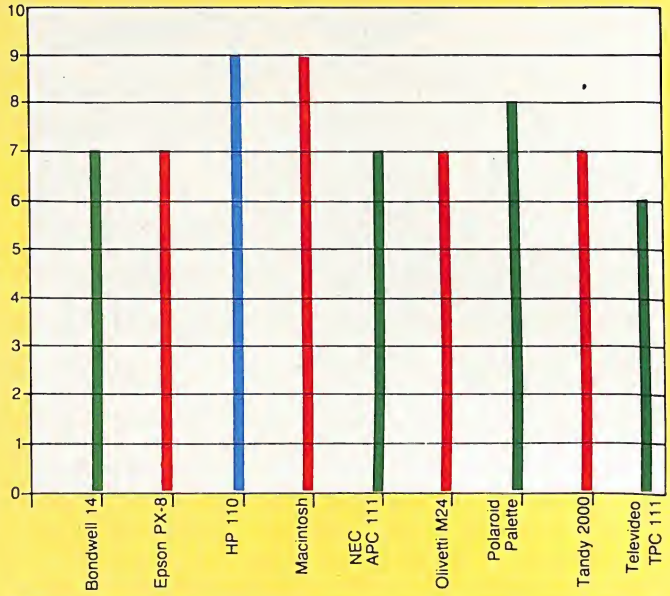


COMPARISONS

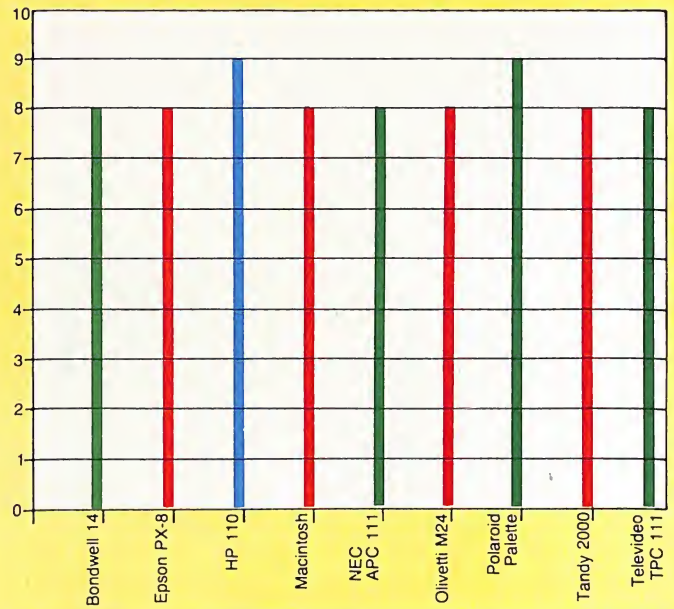
As you can see from these graphed comparisons, the competition for Personal Computer of the Year was tough. All products rated well on the panel's scale, but the HP 110 stands out overall.

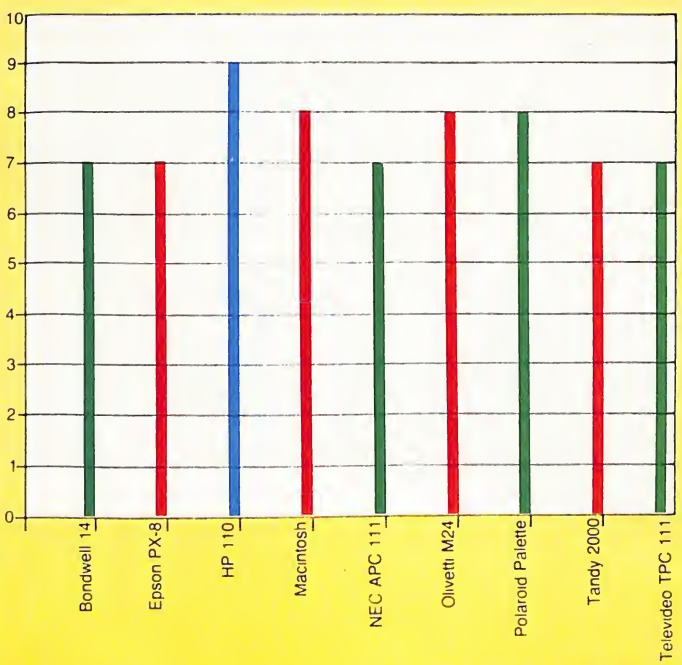
DOCUMENTATION ▶



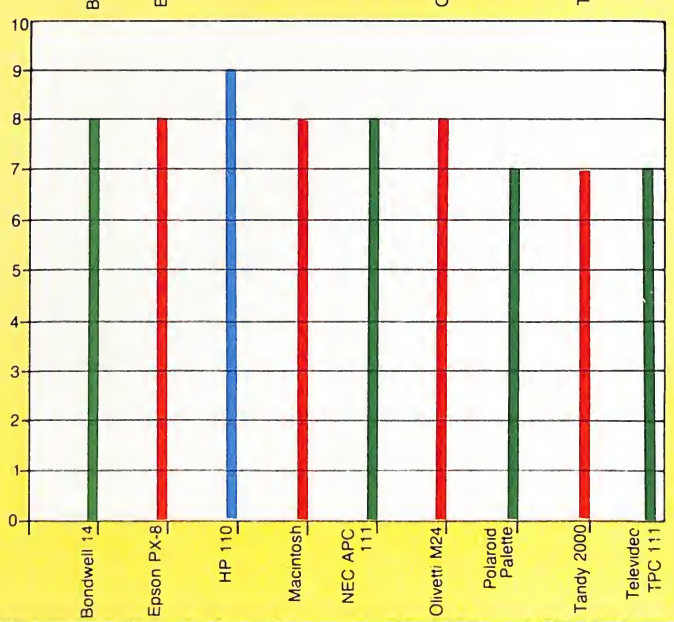


▲EASE OF USE
FUNCTIONALITY ▶



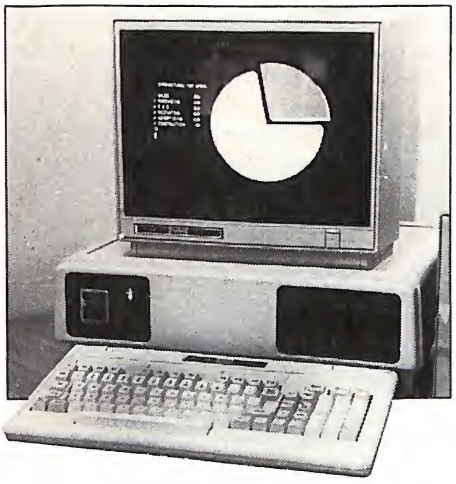


▲SUPPORT
VALUE FOR MONEY ▶



Personal Computer of the Year

■ Televideo TPC II



■ Tandy TRS-80 Model 2000

■ Olivetti M24

■ Polaroid Palette

The panel extended the Personal Computer of the Year category slightly in order to include the Polaroid Palette, which is an innovative system for the preparation of presentation slides using a PC. Although strictly speaking a peripheral, it's a piece of computer hardware attaining high scores in all the criteria the judges applied, and so seemed worthy of inclusion.

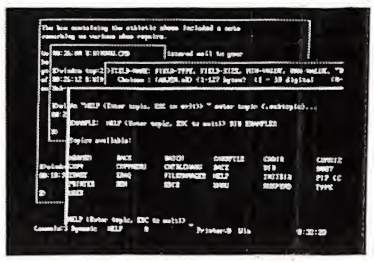
Three machines soon emerged as the leaders: the Macintosh, the HP 110 and the M24. The Macintosh is great fun, but nowhere near as advanced as the Lisa; already programs similar to MacPaint are running on a number of machines. The M24 is probably our choice for the best PC clone on the market; it's smooth, fast, reliable and runs all the software you'll need.

But in the end, it was the Hewlett-Packard HP 110 that won the judges' approval. It's extremely civilised – nice to use, with innovative packaging and features. It's a pleasure to operate, since being portable it's available wherever required. We know other portables are on the way which have similar features – but they're not yet available, and so we haven't been able to stack them up against the 110. We suspect the 110 will hold its own for some time to come, simply because of its quality, Hewlett-Packard's support and the quality of the software supplied with it.

Congratulations, Hewlett-Packard!

In examining the software market, the Panel had similar problems choosing between outstanding products. A lot of software appeared on the market in the last year, much of it excellent, and much of it evolutionary rather than revolutionary. Much of the integrated software, for example, is based on previous experience with spreadsheets, although user interface technology is obviously much improved

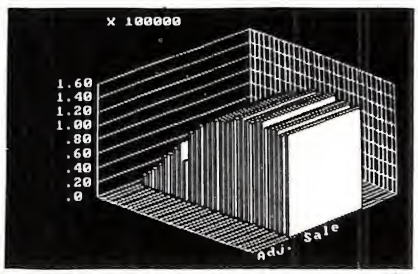
Here is the Software Product of the Year shortlist:



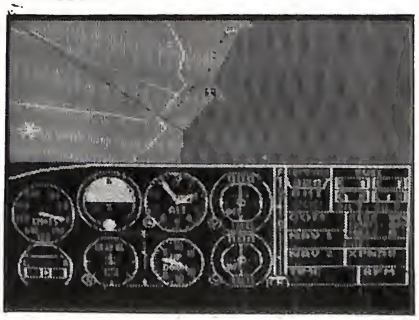
■ Digital Research Concurrent CP/M

■ Ashton Tate Framework

■ Lotus Corporation Symphony



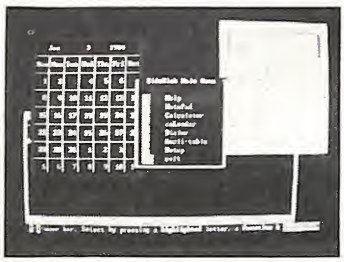
■ Software Products International Open Access



■ Microsoft Flight Simulator II ▷

Personal Computer of the Year

■ Microrim R:Base



■ Borland International Sidekick

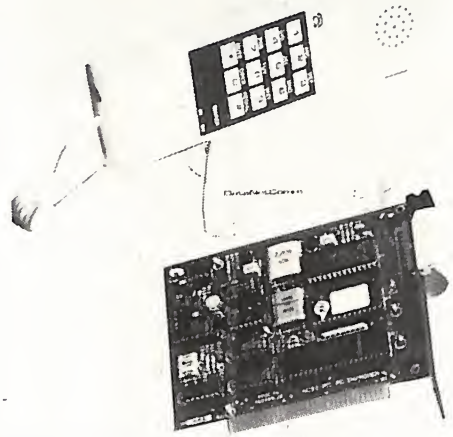
■ Data Access Corporation Dataflex 2.0

This was a tough one. Eventually, the panel had reduced it to a standoff between two packages: Sidekick and Flight Simulator II. We loved them both: Sidekick's pop-up windows are just so convenient, it packs a tremendous amount of useful software into a small package and it's fun to use – but Flight Simulator II is a programming *tour de force* which even swayed those of us who are normally unimpressed by games. We've spent hours flying around New York when we should have been programming.

In the end, the Award went to Microsoft for Flight Simulator II, for the hours of pleasure it affords as well as its outstanding programming.

Australian Commendations

Having prepared the main Award shortlists, the panel then turned its attention to Australian manufacturers. In the panellists' opinions, three hardware products stood out during the year:



■ DataNetComm In/Modem

■ Labtam 3003

■ Portable Computer Company Portapak

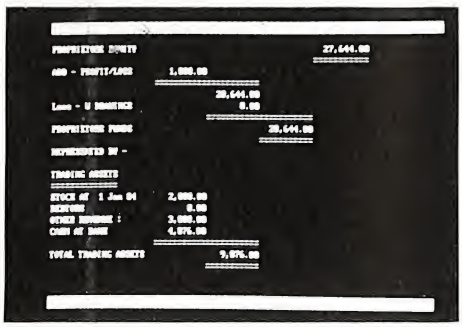
In looking at the Special Commendation for Australian Hardware, the panel was very aware that the shortlisted products varied enormously in capability and application, and the judges took some time over this one.

The Labtam displays very advanced technology and excellent value for money, and the Portapak offers very high performance and features for a portable machine, but it was the DataNetComm In/Modem which really fired the panellists' imaginations. Considering the number of IBM PCs and compatibles at present installed, and the number of applications which will rely on communications, this modem card is certainly bound for success.

Three software packages were considered for the Special Commendation for Australian Software:

■ AID Systems Typequick

■ Hi-Tech Software C Compiler



■ Magnabiz

In the end, after much deliberation, the judges plumped for Typequick as having the broadest application, particularly in overseas markets. In particular, Typequick has scored a recent success in being distributed by IBM

Why the Awards?

The *Your Computer* PCOTY was the world's first Personal Computer of the Year Award, and in its three-year history it has achieved an enviable reputation for independence and integrity. Through the appointment of an independent panel of experts, who are knowledgeable users yet exempt from commercial pressures in their work, the Awards are guaranteed to be unbiased and based purely on merit.

The Awards have two fundamental purposes, in keeping with their two major audiences.

For the magazine's readers – the public at large – the computer industry is becoming more and more visible. There is increasing marketing activity, increasing competition for the consumer's attention, and this – coupled with the increasing complexity of the computers themselves – means that it is more and more difficult for the prospective purchaser to decide what, if anything, to buy.

Therefore, the fundamental rationale of the Awards is to draw attention to worthwhile products; those products released in the last year that offer new features, improved quality or other enhancements. The independent assessment of the Award panel means that even products which have minimal promotional backing can stand out simply on the basis of their performance.

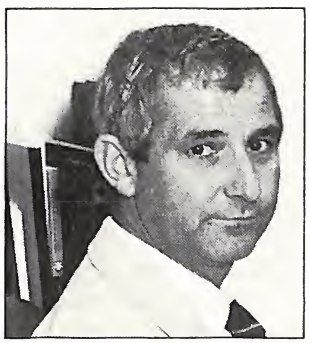
The second audience for the Awards is the industry itself, of which we are a part. It is important for the industry to recognise outstanding achievement, and it is important for achievers to feel they are encouraged and supported by their peers.

This factor is, we feel, especially vital in the case of the Special Commendations for Australian achievement. Australia has the beginnings of a successful computer industry, one that is starting to achieve success in overseas markets. It must be encouraged.

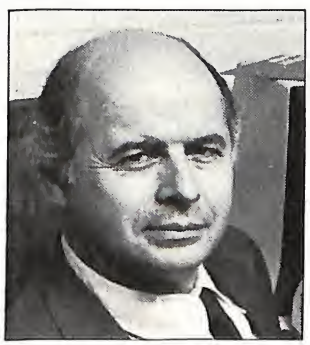
The Panel

Selecting the winners is not a trivial undertaking, and so we set out to ensure that our own personal foibles and preferences could not influence the decision. We did this by selecting a panel of judges who are both experienced and independent. Most people in the industry who have the requisite experience tend to work for one of the computer companies and would obviously be unsuitable.

As in previous years, the panel comprised five members:



Dr Robert Graham is head of the Department of Finance at the New South Wales Institute of Technology, and is a leading expert on the use of personal computers in a corporate environment. He has been involved with personal computers since the late Seventies, and lectures widely on personal computer software.



Phillip Grouse, formerly Professor of Information Systems at the University of New South Wales and now an independent software developer, has long experience with microcomputers, including the design of a multi-user Z80 system in 1979. The author of a number of computer science texts, he maintains a keen interest in personal computing and often pops up on local public access bulletin board systems. ▷

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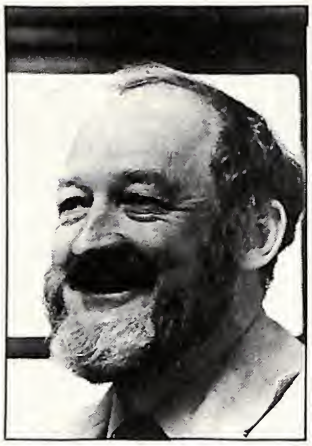
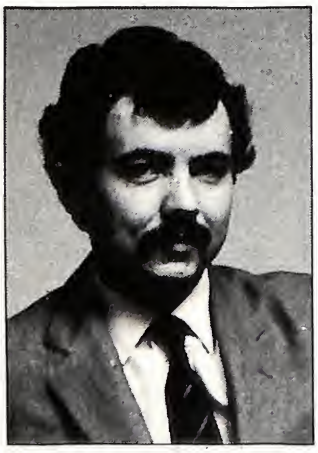


Dr John Barrett is a lecturer in the School of Education at Macquarie University and regularly writes on education for *Your Computer*. He first came into contact with computers at the University of Oregon in 1969 and has been working with micros for several years.

Len Rust is the managing director in Australia of International Data Corporation, a major US marketing consultancy company specialising in the data processing and communications industries. Part of IDC's brief is to continuously monitor the microcomputer market in Australia, and for some years it has been releasing total industry sales figures and forecasts.



Les Bell, managing director of Les Bell and Associates and Consulting Editor to *Your Computer* magazine, has been writing about, building, programming and using microcomputers and personal computers since 1975. He has lectured all around Australia on personal computers and related topics and is acknowledged as an expert in this field.

The members of the panel have between them something over forty years' experience with personal or microcomputers, and should have at least some idea of what makes a good personal computer. They also have almost one hundred years' experience with computers generally!

Subjective Factors Included

Because we have found that attempts to reduce the selection of the winner to a purely objective, number-crunching exercise usually produce slightly skewed results, the panel takes into account various subjective factors. What it boils down to is this: given the opportunity to buy new computers every year, these are the computers the panel would buy.

As in previous years, the panel met initially to review the products released during the last year. It is worth pointing out that to relieve the panel members of undue pressure to select certain products, manufacturers or distributors are not invited to nominate themselves (or each other) for consideration. The panel members are all very active in the industry and know the major products which are released, so they draw up the shortlist in committee. Only at this stage are the finalist companies advised.

From the hardware viewpoint, the last year has been decidedly unspectacular, with little innovation. In part, this is due to IBM's continued strong grip on the marketplace; while most industry commentators estimated that IBM would ship 6000–8000 machines last year, our latest information indicates that the true figure is nearer 30,000 (since IBM never releases its sales figures, we can't be sure).

It is clear that purchasers are satisfied with a tried and true hardware formula which gives them access to a free and open software market – a formula which the IBM and compatibles fit to a tee. Commercial recognition of this means that most machines released last year were compatibles and therefore mostly outside the scope of the Awards. In the words of one observer, "The industry has discovered a large object (IBM) and gone into orbit around it." He went on to observe that some large objects are black holes.

In reviewing the machines released in the last year, the Award panel came to the conclusion that none of them was truly revolutionary in the same way as last year's winner, the Lisa. Rather, they were evolutionary, representing refinements of existing technologies and concepts. For example, the Macintosh evolved from the Lisa; Lisa users may describe it as a backward step, but there can be no doubt that the revolutionary production engineering behind the Macintosh has made the Lisa-style windows and mouse-driven software available to more users.

Similarly, many other machines considered by the panel are really refinements of existing designs, such as the Olivetti/AT&T M24, which is based on IBM PC architecture; the Bondwell 14, which takes the Osborne-style transportable concept somewhat further; and the Epson PX-8 and Hewlett-Packard 110, which represent a new breed of lap machines.

By the time the panel, over lunch, had reached the stage of agreeing on a shortlist, the restaurant which it had commandeered wanted to re-open to the public for dinner, so an agreement was reached to reconvene in two weeks, by which time we would have obtained all the shortlisted products for review.

On the appointed date, the panel members squeezed into an office that turned out to be extremely cramped after the systems had been set up and the software installed. There followed a morning of fierce debate, intense investigation of products, another long lunch, more investigation and finally, that highly desirable state, consensus.

And so we had our winners: the Personal Computer of the Year is the HP 110 portable computer; Microsoft's Flight Simulator II is the Software Product of the Year; and the two Australian Special Commendations are awarded to DataNet-Comm's In/Modem and AID Systems' Typequick. On the following pages you'll find detailed descriptions of all the shortlisted products, both hardware and software, so you can judge for yourself which of these excellent products would best fill your particular needs. □

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HEWLETT-PACKARD'S HP 110

In last year's award shortlist, we examined a number of portable computers, and were impressed by the potential of these lap machines. One immediate problem we saw with them was the absence of any standard operating system, requiring software to be specially written. This year, we have seen the entry of new machines which use industry-standard operating systems and are considerably more powerful. The cream of the crop is Hewlett-Packard's new lap machine, the HP 110.

The 110 is truly lap-sized at only 330 by 250 by 73 mm and weighing just 4.1 kg. Most of the weight can be attributed to the sealed lead-acid battery which powers the 110; nicads were considered but rejected as not providing operation for long enough periods between recharges.

Two flat sliders on the front of the machine release the display, which tilts up, revealing the keyboard underneath. We found the tilt mechanism a little stiff and awkward to use, but then it has to be to allow the display to tilt to the right angle and then stay there.

The keyboard has 76 sculpted keys, which covers a full qwerty keyboard, eight function keys and some miscellaneous keys such as 'SELECT', which is used to select items on menus. The keys have a comfortable feel and would be suitable for high-speed use.

The display is, as you would expect, a liquid crystal type. Two versions are available, with 80 by 12 or 80 by 16 characters respectively. Not only is the display a full alphanumeric type, it is also dot addressable, with a resolution of 480by 128. LCDs have certainly advanced dramatically in the last couple of years.

Innards

Inside the machine is an amazing display of technical wizardry. The processor is an 80C86, a CMOS (complementary metal oxide semiconductor) version of the 8086 processor which consumes much less power. It runs at 5.33 MHz clock speed, which is just under 12 per cent faster than an IBM PC, and of course the actual performance is faster still since it fetches 16 bits at a time, as against the eight bits of the IBM.

This of course gives rise to very impressive performance. The Sieve of Eratosthenes benchmark runs in 1260.92 against the IBM's 1953.53 – 54 per cent faster!

Turning our attention to memory, we discover that the 110 has 272 Kbytes of RAM. It is important for a portable machine to have plenty of memory, particularly since one may go for extended periods without being able to transfer the contents of memory to disk. The user is able to partition the 110's memory between main memory – that is, where programs load and run – and pseudo disk drive, where files are stored. The 110 is particularly forgiving in that it will not allow the user to reduce the size of the disk space below that required to hold the current set of files – in order to reduce it further one must erase files first.

The 110 also has 384 Kbytes of ROM, a very considerable amount for this kind of computer. The reason is that it stores not only the operating system, but also a complete implementation of Lotus 1-2-3. This indicates the major market segment Hewlett-Packard is targeting with the machine: corporate executives, who are, presumably, always on the move.

At the back of the machine are the ports which interface it to the outside world: there's an RS232C port with a non-standard 9-pin connector, and two connectors for the Hewlett-Packard Interface Loop, a small and simple local area network for battery-operated equipment which first made its appearance on the HP-41 family of calculators. Expansion through the Interface Loop is very simple; the connectors are polarised so that they cannot be inserted wrongly and all you have to do is wire each peripheral to the next to complete the loop. Perhaps the first peripheral selected by most users will be the HP ThinkJet printer which, like the 110, is battery operated. This provides very good print quality – provided you use the right paper – and is quick and above all silent. Another important peripheral is the 9114 floppy disk drive, which accepts 9 cm disks with a capacity of just under 800 Kbytes. Much of the software for the 110 will be available in this format, so heavy users who want to go beyond Lotus will need it.

Standard Software

The HP 110 runs MS-DOS 2.1, giving it access to a fair range of software – WordStar, dBase, Condor and other generic MS-DOS programs. It's not compatible with the IBM PC, however, shutting out a number of significant programs – of which Lotus 1-2-3 is probably the most notable, but which has already been nicely taken care of.

The 110 is, however, compatible with the earlier HP-150, and can run most of the software adapted for that machine. For example, in deriving our benchmark timings, we used the HP-150 version of BASIC-86. It's interesting to note that the 110 does not come with BASIC in ROM; the notion that users will do their own programming in BASIC has now well and truly flown out the window.

However, there is a lot of software in that ROM. As mentioned above, there's a complete implementation of Lotus 1-2-3, with full help screens, graphics, everything. The ability to place models onto a portable machine which can be taken unobtrusively into meetings is of high value to many users.

Also in the ROM is HP's Personal Applications Manager, a menu-driven 'shell' for

SPECIFICATIONS

HP 110

Made By:	Hewlett-Packard
Processor:	80C86
Clock Speed:	5.33 MHz
RAM:	272 Kbyte CMOS static RAM
ROM:	384 Kbyte CMOS ROM
I/O:	Hewlett-Packard Interface Loop and Serial Interface (RS232)
Languages:	Runs MS-DOS languages
Keyboard:	75 keys including eight special function keys
Display:	16 lines x 80 column LCD
Graphics:	128 x 480 pixel, bit-mapped graphics
Peripherals:	ThinkJet printer, disk drive
Expansion:	9 cm micro floppy disk drive
Best points:	Long battery life
Worst points:	
Extras included:	Vinyl carrying case
Options:	9 cm micro floppy disk drive, ThinkJet printer
Price:	$4834.24
Review unit from:	Hewlett-Packard Australia Pty Ltd, 17-23 Talavera Road, North Ryde 2113; (02) 888 4444.

PIC: HELMUT MUELLER

DOS. PAM reads a simple menu file on each disk and displays a menu of applications, together with certain ancillary functions – like switching off, for example (incidentally, the 110 switches itself off in any case). Another interesting feature of the PAM display is the battery charge indicator, which shows percentage of full charge, rather than simply alerting you ten minutes before dying.

The 110's word processor is Memomaker, a simple word processor which is logically organised and can do everything a user on the move is likely to require. For those with more demanding requirements, WordStar can be used.

Also in the 110's capacious ROM is a communications utility which provides terminal emulation as well as file transfer. To match this there is a series of set-up menus which allow you to configure the machine for baud rate, communications ports, RAM drive size, power-off delay and so on.

All in all, the software is quite civilised and easy to use, and much simpler than the hieroglyphic command lines required by the MODE command provided by DOS, for example.

Performance

The 110's performance is excellent. Heavy Lotus users, for example, who build large models, regularly complain of long recalculation times, and probably would not accept any further delays even when traded for portability. The good news is that the 110 is faster than the IBM PC; as mentioned above, on our standard Sieve of Eratosthenes benchmark it came out 54 per cent faster. Part of this superiority is due to differences in the BASICs used, but Lotus users can expect recalculation to be at least 12 per cent faster.

Innovations

The HP 110 is a solidly innovative computer – more so than the other machines we examined. It breaks new ground for portable computers in battery life, memory capacity, and processor performance. Part of its appeal is also the Hewlett-Packard attention to detail coupled with an almost indefinable engineering elegance – details like the battery condition display clearly show that this machine has been well thought out. □

OLIVETTI'S M24

In a year of refinement, the Olivetti M24 is one of the most refined machines in the IBM compatibles stable. Marketed in the US by AT&T as the 6300, the M24 was designed by Olivetti to be as compatible as possible with the IBM PC, yet offer significant performance improvements.

It's human nature to want to own the best of anything; for example, we buy a car simply to get us from A to B, but still there's a good market for sports cars capable of getting us a speeding ticket without visible strain. Likewise, we buy an IBM-compatible PC to get access to all that software, but regardless of whether we really need it or not, it's nice to have something a bit more powerful than a straight PC. The M24 fits this category perfectly.

Firstly, the M24 has a somewhat smaller footprint than the IBM PC, and its dimensions are generally smaller. When desk space is at a premium this is important.

Internally, the construction of the M24 is quite different from the PC. Most of the electronics is on a motherboard on the underside of the unit, while a motherboard on the top side accepts expansion cards. The main circuit board carries the processor, up to 640 Kbytes of memory (using 256 Kbit RAM chips), disk controller, serial port and parallel port. One slot is required for the video controller – either monochrome or colour – and all the rest are free.

The other major difference from the PC is the M24's processor. Based on an 8086

SPECIFICATIONS

OLIVETTI M24

Made By:	Olivetti
Processor:	8086
Clock Speed:	8 MHz
RAM:	128 Kbytes expandable to 640 Kbytes
ROM:	16 Kbytes with power-on diagnostics and bootstrap
I/O:	1 serial, 1 parallel
Languages:	Heaps – all MS-DOS and CP/M, and so on.
Keyboard:	Numeric and cursor keypads, 10 programmable function keys
Display:	30 cm colour screen
Graphics:	640 x 400 resolution
Peripherals:	
Expansion:	Memory, graphics boards, extra comms port, Omninet/Ethernet Boards
Best points:	Speed, design, IBM compatibility
Worst points:	Large monitor
Extras included:	
Options:	Keyboard, mouse
Price:	$5318 retail + tax for 256 Kbyte machine
Review unit from:	Olivetti Australia Pty Ltd, 140 William Street, Sydney 2000; (02) 358 2655

processor with a clock speed of 8 MHz, the M24 is over twice as fast as the IBM machine. Now speed isn't everything, but your favourite word processor will feel so much nicer to use, as scrolling and screen updates will be faster. In fact, our benchmarks revealed the Olivetti machine to be 2.19 times faster than the IBM, using the Sieve of Eratosthenes benchmark.

Because the 8086 is a 16-bit processor, the M24 can access 16-bit peripheral cards. But how, I hear you cry, if it is IBM-compatible, because the IBM has an 8-bit bus? The answer is that the connectors inside the M24 are the same as those on the PC, and you can plug in cards in the usual way. However, the M24 also has another set of connectors at the front of the motherboard, which carry the remaining eight bits of the M24's 16-bit bus. Of course, only Olivetti expansion cards use this at present, but it gives the best of both worlds.

Other Options

The M24 offers the user a number of other options. Two keyboards are available, one with the same layout as the IBM PC (but with lock indicating lights), and the other having more keys and being more suitable for heavy word processing use.

Another ingenious add-on is Olivetti's mouse, which works with virtually any software, since it emulates presses on the cursor and function keys.

Various disk configurations are available. Our evaluation model had two 360 Kbyte slimline disk drives, but the M24 is also available with 720 Kbyte disk drives, and of course one of the drives can be replaced by a 10 Mbyte hard disk.

Other options include an additional serial interface, dual serial interface boards, Z8000 alternative processor board (to run M20 software under PCDOS), and network interface boards for Omninet and Ethernet.

One minor complaint is the size of the M24's colour monitor, which dominates the machine and actually makes it bigger than the IBM PC. Another hidden gotcha is the absence of any composite colour video output from the colour card, making it impossible to interface with the Polaroid Palette.

Overall, however, we have been very impressed with the M24's performance. For those looking for a machine which can use as much software as the IBM PC, but has a little extra performance, this has to be the one. □

APPLE'S MACINTOSH

We very much doubt if there are any readers who haven't heard of the Macintosh. Since its release early last year it has sparked a heated controversy about Apple's approach to personal computer design. On one side are those who maintain IBM's approach is the only way to go, while the Macintosh supporters claim the IBM PC is a dinosaur.

The Macintosh is certainly different from the traditional approach exemplified by the IBM machine, but we can hardly call it revolutionary. Instead it is a natural evolution of the earlier Lisa, which won the Personal Computer of the Year Award last year.

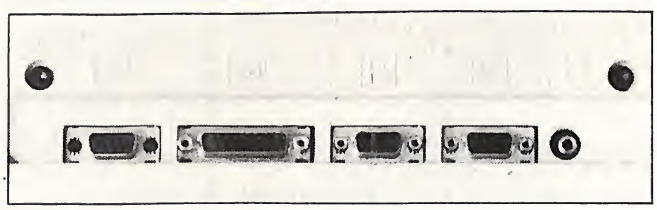
There were two problems with Lisa: first, it was expensive (though that's now been fixed), and second, it didn't fit most people's impressions of what a computer should do; that is, accounting, mailing list management and other data-intensive applications. It was never meant to do those things; it's rather a machine to support professionals and 'knowledge workers', which it does excellently. Of course, an apparent shortage of software gave critics cause for alarm, while users understand virtually no other software is required.

Mac fixes these problems in a computer for the masses. It takes the Lisa software ▷

SPECIFICATIONS

MACINTOSH

Made By:	Apple Computer Pty Ltd
Processor:	68000 Motorola
Clock Speed:	8 MHz
RAM:	128 Kbyte or 512 Kbyte
ROM:	64 Kbytes containing bulk of operating system primitives
I/O:	2 serial
Languages:	BASIC, Pascal
Keyboard:	58 keys
Display:	23 cm screen
Graphics:	512 x 342 resolution
Peripherals:	Printer
Expansion:	Hard disk, memory, network real soon now
Best points:	Simple user interface
Worst points:	Just niggly little things
Extras included:	
Options:	Numeric keypad
Price:	$4395 retail inc. tax for 512 Kbyte machine
Review unit from:	Apple Computer, 37 Waterloo Road, North Ryde 2113; (02) 888 5888.



technology and unbundles it in a stripped-down form for the support of third-party software. Now we have a choice of software from Apple and other suppliers, most of it nowhere near as good as the Lisa software, but at least we can have all the fun of choosing it ...

So What's New?

What is new about Mac is the application of severe production engineering methods to its design. This is a machine which is intended to be built in vast quantities at low cost, in order to compete with the Japanese. It's a strategy which is working, to Apple's credit: two factories are now producing a Mac every 27 seconds each, for two shifts every day. Observers estimate that Apple sold 380,000 Macintoshes last year.

For our evaluation, we obtained a 512K Macintosh (a 'Fat Mac') with an external disk drive and Imagewriter printer, together with a box (a *big* box – what happened to the Mac software drought?) full of software. We also had a pre-production version of the Apple modem.

There's no doubt the Mac is easy to use; in fact, it's well-nigh foolproof. We dispensed with reading manuals and simply got on with the job, but when we later went back to examine the manuals we were impressed with their thoughtful design and the provision of tutorials on disk and audio tape.

Software

When we looked at the software provided, the story was a bit different. There is a lot of software for the Mac now, and more on the way, but the quality is extremely variable. Some of the packages are unimaginative, to say the least, in their use of the Macintosh's features, and many don't make proper use of Mac facilities like windows. To sum up the situation, one can say that when Mac software is good, it is very good, and when it is bad, it's no worse than most IBM PC software. It's just disappointing that it's not better. A big Mac software review is planned for *Your Computer* shortly ...

For those who haven't played with a Mac, the first thing you'll notice is its unusual shape; it's designed to have a small footprint and achieves that very well. The next impressive factor is its high-resolution black and white screen, which emulates a desktop with disks and files on its surface. You work by manipulating these icons with a mouse, something that takes a little practice but soon becomes second nature. There are no cursor keys on the Mac.

The Mac's 9 cm disks (I object to translating generic disk sizes into metric values – what I'm *really* talking about here is three-and-a-quarter inch disks) have a capacity of 400 Kbytes, which is more than adequate for most applications: the Mac is not intended to be a large database machine. Of course hard disks are available from third-party vendors, and Apple itself has plans in that area.

Perhaps the best selling point for the Mac is its MacPaint program, which allows the user to draw virtually anything and is so totally seductive a piece of software that it is virtually impossible not to want a Mac after using it. One can draw with a brush – of virtually any shape, and with virtually any paint pattern – or even with a spray can, and if the result is not quite right go back and edit it using FatBits.

Already a Success

There is no doubt by now that Macintosh is a success; with the formation of user groups and the entry of third-party software and hardware suppliers, the subculture which will assure the machine of a long life is now emerging.

If Macintosh had appeared on the market before Lisa, it would certainly be the Computer of the Year; but in reality the Mac is an evolution from the Lisa, with not all the changes being improvements. It's probably the most unusual machine to be released in the last year, though □

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Sue Robinson, the *AUSTRALIAN.*

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EPSON PX-8

The Epson PX-8 is a very powerful lap computer which features comparable facilities to those found on larger machines, and with its three processors offers a level of sophistication not found in many desktops.

While earlier machines such as the Kyocera family of lap computers didn't offer any kind of standard operating system, the PX-8 breaks new ground by utilising CP/M 2.2.

Despite its small size (297 by 216 by 48 mm), the PX-8 is actually based on three separate processors, a level of sophistication not attained by most desktops. The main CPU is a Z80 (actually it's probably an NSC-800, which is a CMOS processor software compatible with the Z80), which gives the machine the ability to run CP/M. A second processor (a 6301) controls the display and I/O devices, while a 7508 controls the keyboard and A/D converter.

From the outside, the PX-8 looks quite innocuous, particularly when folded up. A handle slides out to make the unit easier to carry, and a cover slides off to reveal the 72-key keyboard. Now the hinged display can be released and tilted back ready for use. The display is an 80-column by eight-line liquid crystal type, which has a graphics resolution of 480 by 64 pixels.

The machine has a basic memory of 64 Kbytes, which is allocatable between the main memory and RAM disk emulator, plus 32 Kbytes of memory containing the CP/M operating system and some utilities. The secondary processor has its own 6 Kbytes of 'video' RAM and 4 Kbytes of ROM. For those who wish to manipulate larger files than the 64 Kbytes of memory will allow, two additional RAM packs are available, with 60 or 120 Kbyte capacity.

Micro-cassette Drive

With the display folded back, the built-in micro-cassette drive is revealed. Although this is a tape mechanism, the operating system has been modified through the addition of two extra modules, the MTOS (Micro-cassette Tape Operating System) and MIOS (Micro-cassette I/O System), and treats the tape as another disk drive. Of course, it is not as fast as a real disk, and capacity is limited to twelve files on each side by virtue of the space allocation for the directory at the start of each tape, but it is treated as drive H:, allowing the use of standard CP/M commands for loading and saving files. ▷

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BARSON COMPUTERS

Dow McIntosh & Kelly BAR 064

On the underside of the unit there is a panel, behind which are two sockets for additional read-only memories. These ROMs, which are addressed as drives B: and C:, can contain software packages such as a BASIC interpreter, Portable WordStar, Calc or Scheduler.

At the back of the machine is a small panel which allows connection of peripherals. Input/output provided includes a serial communications port, a printer port, external speaker jack, A/D converter input and expansion through a system bus.

The operating system is an extended version of the old favourite, CP/M 2.2. As far as we could tell, it behaved identically to implementations on desktop machines. However, it has been extended considerably, particularly to support the PX-8's built-in tape drive.

The operating system comprises a number of modules on top of those which normally constitute CP/M (the CCP, BDOS and BIOS). A password module can lock out unauthorised users and keep your memos confidential by refusing to power the system up until it gets the right password. A main menu program eliminates the 'A)' prompt which users sometimes find troublesome and substitutes a menu display from which the desired application can be selected.

A screen dump module allows the user to dump the current contents of the screen to an Epson printer, while the clock module allows alarm setting using wildcards: for example, the date/time string 06/** 15:15 will set the alarm to ring at 3:15 pm every afternoon throughout June. Finally the system activator controls the auto-start function (a program can be run automatically on power-up), initialisation, and so on.

An interesting extension to the CP/M BIOS called the user BIOS allows advanced I/O programming. For example, applications programs can load their own special device drivers into the BIOS, where they logically belong.

The system is configured using the system menu display, which allows functions such as setting the real-time clock, manually controlling the tape drive, configuring the serial port and other functions.

Software

Available software includes Microsoft BASIC, with appropriate extensions to drive the hardware features of the PX-8, including graphics and sound.

Most users, however, will probably opt for the Portable WordStar option. This version of the popular word processing program has been redesigned to cope better with the small screen of the PX-8, principally through the omission of help menus. Some other features have been dropped, including some main menu options, the ability to have hanging paragraph indents, decimal tabs, hyphen-help and column mode.

As a result, Portable WordStar is perhaps more difficult to master than the desktop PC full-screen version, but it offers virtually all the main features. This is an important benefit for those who want to use a lap computer as an adjunct to a desktop but don't want to learn two word processors.

An additional pair of options appears on the main (no-file) menu; these are for file up-loading and down-loading, and are particularly useful for those who use the PX-8 along with another larger computer.

Other software which is available for the PX-8 includes Portable Calc, which is actually CalcStar, and Portable Scheduler, which uses the real-time clock and alarm functions of the PX-8.

A range of peripherals is available for the PX-8; Epson started out making peripherals, but certainly doesn't intend to finish there. Most significant, perhaps, are the disk drives. We were provided with the PF-10, which is a battery-operated microfloppy drive of 360 Kbytes capacity, while a 13 cm drive is also available (the TF-15). A matching battery-operated thermal printer (the P-40) may be used, or the machine can be operated with the well-known Epson RX-80 and FX-80 printers. Of course, it will probably work with other printers with the provision of the appropriate cable.

Other goodies available include a battery-operated acoustic coupler, allowing communications while in the field, and a bar-code reader, which has potential applications in inventory control, retail sales and other areas.

The PX-8 is significant for several reasons. Not the least of these is the provision of a standard operating system which gives purchasers access to a range of software, rather than requiring special software as previous lap computers have done. Next, there's the quality of construction, which is excellent, with a good solid feel. On top of this there's the memory capacity and the range of peripherals. These all combine to make the PX-8 a very attractive machine indeed. □

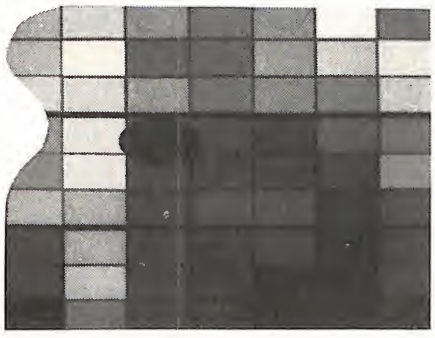
SPECIFICATIONS

EPSON PX-8

Made By:	Epson Corporation
Processor:	Z80-compatible
Clock Speed:	2.45 MHz
RAM:	64 Kbytes
ROM:	32 Kbyte
I/O:	1 RS232
Languages:	BASIC, plus CP/M languages
Keyboard:	72 keys including cursor pad
Display:	Liquid Crystal Display, 80 columns x 8 lines
Graphics:	480 x 64
Peripherals:	Disk drives, printers, acoustic coupler, bar code reader
Expansion:	60 Kbyte and 120 Kbyte RAM packs
Best points:	Uses CP/M for greater software versatility
Worst points:	None to speak of
Extras included:	
Options:	
Price:	$1300
Review unit from:	Epson Australia Pty Ltd, Unit 3, 17 Rodborough Road, Frenchs Forest 2086; (02) 452 5222.

POLAROID PALETTE

This year, for the first time, we have extended the Personal Computer of the Year Award category to include a hardware product that is not a personal computer. The Polaroid Palette is a particularly significant peripheral for the IBM PC, Apple and DEC Rainbow computers.



Graphics presentations are always a lot of work, and it is particularly galling to see excellent graphics displays of financial results and the like, then be unable to use them in a meeting. The Palette provides a neat solution to this problem.

Basically, the Palette accepts the video output of the computer and displays it on its own small, high-quality CRT. Close to the face of this screen is a set of three colour filters and then a camera. Some electronics in the Palette box rotate the filters in front of the camera, under control of software in the computer.

The secret of the Palette's operation is the fact that it puts the PC into monochrome mode to output images, and uses the colour filters – in varying amounts according to time of exposure – to add the colour. Under the Polaroid software, 72 colours are possible, although the standard IBM PC can generate only four colours at one time.

The first step in using the Palette is to produce a colour key image. This shows you exactly what colours are available using the system as it is set up for a particular film, with a particular camera, and so on. Given this set of reference colours, you can now go ahead and produce whatever images you wish, with whatever software you want.

Once an image has been created, it is saved on disk. This is done using the PSAVER program, which is supplied as part of Polaroid's software. The program is loaded into memory and attaches itself to the operating system. Once you have an image on the screen that you want to save, pressing the PrtScr key will bring up the PSAVER menu and you can now save the image to disk.

Prints and Slides

To produce a print or a slide from this captured image is very simple. First the Palette driver is fired up and the image loaded. Then the appropriate colour set is ▷

SPECIFICATIONS

POLAROID PALETTE

Made by:	Polaroid Corp
Processor:	Alkali chemical-based
Clock speed:	60 seconds/minute
ROM:	Presumably
I/O:	Serial RS232C and video
Display:	35 mm slides or 82.5 by 108 mm prints
Graphics:	Yes, resolution dependent on host machine
Peripherals:	It is one!
Expansion:	
Best Points:	Superb images
Worst points:	Heavily hardware dependent
Extras included:	35 mm camera with autowinder (buy your own lenses and photograph anything else)
Options:	Additional graphics software
Price:	$2200 plus tax (22.8%)
Review unit from:	Polaroid Australia Pty Ltd, Eden Park Estate, 31 Waterloo Road, North Ryde 2113, (02) 887 2333

loaded for this image – it is possible, of course, to print an image several times with different colours – and then the film is exposed. Exposure can take up to several minutes, depending on the saturation of colour in the image. The worst case would be an image that contained strong blue, strong green and strong red.

The important point here is the generality of the PSAVER program. It is completely independent of any program other than DOS, and so can be used with any program at all. It simply captures whatever is on the screen.

Now, the conventional resolution of the IBM PC in colour mode is 320 by 200. However, in monochrome mode, it is capable of 640 by 400, and this is used to advantage by some packages which can drive the Palette directly rather than through PSAVER. Packages like DR Draw can drive the Palette with the full resolution of the PC screen, even in colour.

What You Get

Included in the Palette package is the software, the Palette itself, all cables required, a Polaroid colour print camera, a Minolta 35 mm camera with motor drive and an instant slide film processor. This last is particularly useful for rush jobs, as you can use Polaroid colour transparency film and process it in less than ten minutes, with no mess or fuss.

The motor drive is particularly handy when making up batches of slides, since it allows unattended operation. You would normally produce prints first to see the effects of different colour combinations, then once satisfied, save the image/colourkey combination to disk for later 'printing' as part of a slideshow. Once a sequence of slides has been assembled this way, it can be converted into a set of slides by letting the computer control the Palette and the camera with autowinder while you work on something else.

The quality of slides produced by the Palette is excellent. They are clear and sharp, much better than those shot directly from the monitor screen. Plus, of course, they have a better selection of colours.

For anybody who uses a PC and has to make presentations, the Palette is a must. Versions of the Palette are available for the IBM PC, DEC Rainbow and Apple II computers.

The Polaroid Palette was reviewed in detail in the January 1985 issue of Your Computer. □

TELEVIDEO TPC-II

Manufactured by Televideo, a company with a good track record in the hardware area, the TPC II could be the ideal machine for a user who wants portability, IBM compatibility and a competitive price.

The transportable computer market has been established since entrepreneur Adam Osborne turned the market upside down with the Osborne I. However, while an eight-bit machine with limited mass storage was acceptable in 1981 (especially at the price) the world has moved on since then. In particular, the dominant influence since then has been the IBM PC.

Many people want a computer which is compatible with the IBM PC. Being portable is a nice bonus, particularly if their work takes them away from the home base. Most people in Australia are not particularly concerned with buying the genuine article, if they can get the same benefits from a compatible machine at a lower price, the evidence is that most will buy it. This is in contrast with the US market, which is dominated by the IBM machine and that 'respectable' compatible, the Compaq.

Although Taiwanese imports are grabbing a significant share of the compatibles market, there can be no doubt that most people still prefer to purchase a machine from a company with some kind of track record. Televideo has been manufacturing terminals since the early seventies, and has a good reputation for a quality terminal at a competitive price. In fact, many of the terminals around *Your Computer's* office system are Televideos

Some time ago, Televideo entered the ▷

The NEC APC III

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- DR Draw
- DR Graph
- Graphplan
- PFS Graph

LANGUAGES

- GW BASIC
- Dr Logo
- MS BASIC Interpreter
- MS BASIC Compiler
- MS Business BASIC Compiler
- MS Cobol
- MS FORTRAN
- MS Pascal
- MS C
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NEC APC III

ADVANCED PERSONAL COMPUTER III

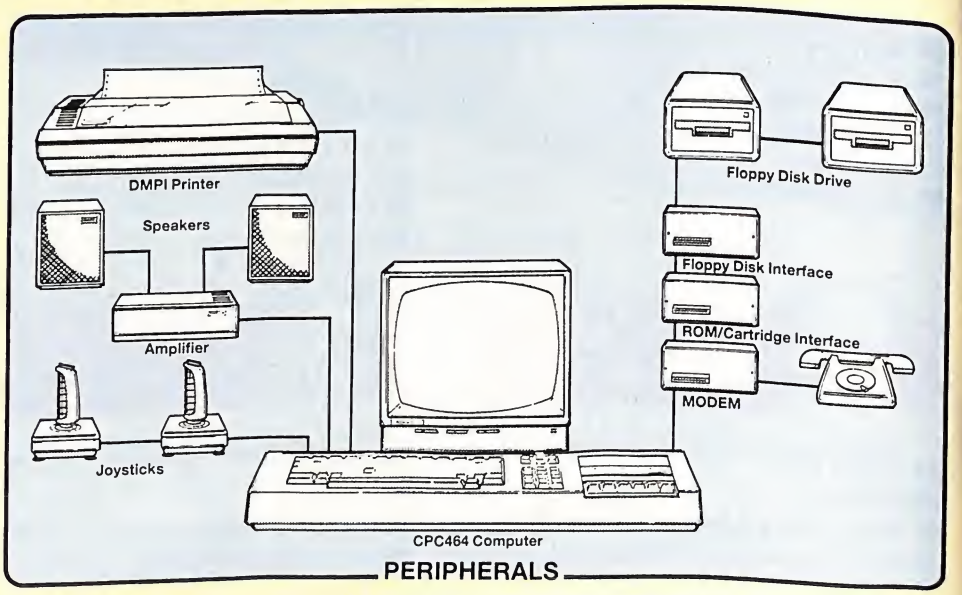
After everything that's been said in praise of Amstrad's CPC464, is there anything to add?

Plenty.

The CPC464 is an enthusiast's dream come true.

Few applications are beyond its capabilities, with its sophisticated features, complete expansion bus connector for sideways ROMs, serial interfaces, disk drives and modems.

No wonder the press is in raptures over it.



The CPC464 system.

It comes complete and ready-to-go. Here's what you get for an incredibly low price.

64K of RAM (42K available), 32K of ROM, colour monitor or green screen VDU, typewriter style keyboard, integral cassette data recorder and a very fast extended BASIC.

The CPC464 offers you high resolution graphics, 80 column text display, up to 8 text windows plus a graphics window and a palette of 27 colours.

Not to mention a 3-voice, 7-octave stereo output you can feed through a hi-fi amplifier and speakers.

Now we think you'll agree, that's some system.

CPC464 green screen VDU (GT64)

Low cost disk drive.

An inexpensive floppy disk system is available which includes CP/M* (giving you the option to access 3000 proven programs) and LOGO with its famous educational applications.

Optional disk drive DDI-1 including interface CP/M* and LOGO

Printer port.

The CPC464 has a built-in standard parallel printer interface which offers you the facility to provide permanent reference of program listings, letters, invoices, anything that requires 'hard copy'.

Optional 80 column dot matrix printer DMP-1 operates at up to 50 characters per second. Combined with the CPC464, it offers a high performance text processing system.

Joysticks. Power supply modulator.

You can bring those arcade games stunningly to life with the optional joystick controller which has a socket for a second stick.

The optional power supply and modulator enables the CPC464 to be connected to any home colour TV.

Amsoft. Fast growing software.

The high quality software takes full advantage of the CPC464's high specification and speedloading capability. Which means even complex programs can be loaded quickly.

A range of software is already available. And it's growing rapidly.

Educational programs, business applications and arcade games are all designed to utilise the CPC464's impressive graphics, sound and processing abilities.

Amstrad. User Information Service.

Whether you're interested in serious commercial applications or you're a games fanatic you'll want to receive the latest information about your AMSTRAD Computer. Upon request you will be advised about the latest software and its application, special information concerning your CPC464, available peripherals and software reviews. There will also be programs and exercises to try.

In addition to the User Information Service you will be given details of where you may contact your nearest independent user club.

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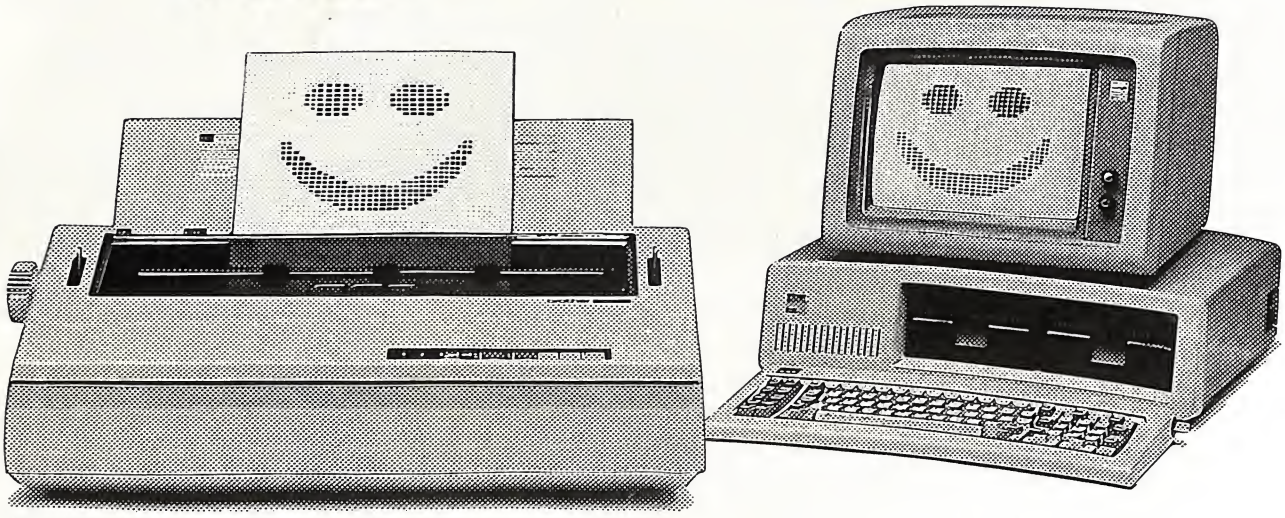
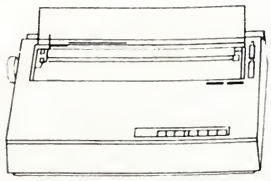


BROTHER HR-35

Over the last 20 years, Brother have come to be regarded as the experts on the typewritten word.

So, whether you want daisy wheel quality or dot matrix speed, chances are Brother have a printer that's compatible with both your computer and your needs.

See your Brother dealer soon for a demonstration and you'll understand why Brother are now considered the experts on the printed word.



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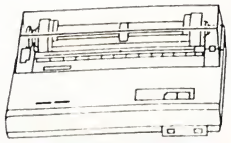

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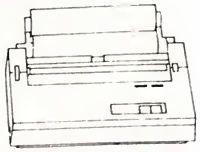

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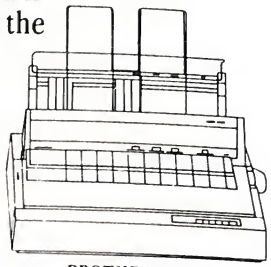

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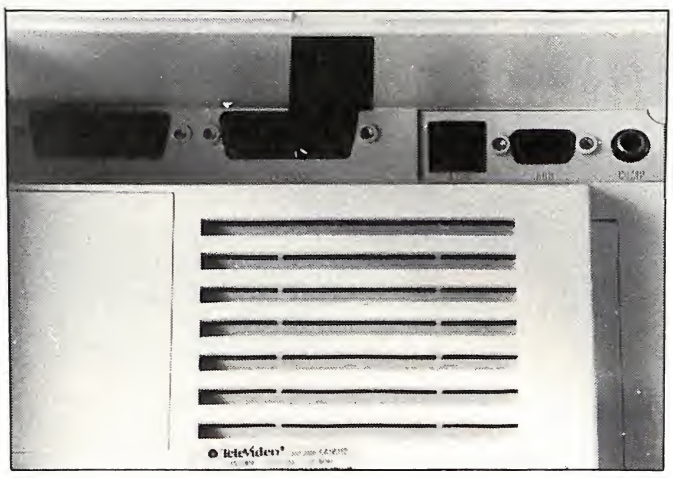
CSO 1336

SPECIFICATIONS

TELEVIDEO TPC-II

Made By:	Televideo
Processor:	Intel 8088
Clock Speed:	4.77 MHz
RAM:	256 Kbyte
ROM:	Bootstrap and diagnostics
I/O:	1 RS232C, 1 parallel port, composite colour monitor port, RGB colour monitor port.
Languages:	GWBASIC
Keyboard:	Same layout as IBM PC
Display:	23 cm non-glare yellow phosphor screen, 25 lines x 80 columns
Graphics:	640 x 400 (monochrome), 320 x 200 (colour)
Peripherals:	
Expansion:	TS 1605E expansion box
Best points:	Solid feel, nice design
Worst points:	Only one slot
Extras included:	
Options:	
Price:	$3895 plus tax (2 drives)
Review unit from:	Data Peripherals Pty Ltd, PO Box 379, North Ryde 2113; (02) 888 5733



market with a range of eight-bit machines, then sixteen-bitters and a network system based on TurboDOS. In fact, it's hard to think of a manufacturer with as broad a product range as Televideo's, stretching as it does from eight-bit CP/M machines through networks and now to IBM compatibles.

Enhanced Portable

The TPC II is an IBM-compatible portable which offers a number of enhancements over earlier machines. This is primarily achieved through the use of a six-layer printed circuit board for the main circuitry, which allows a large number of functions to be crammed onto a small board.

The TPC II is smaller and lighter than the IBM Portable PC, and is generally more manageable. The handle is at one side of the case, providing reasonably easy carrying, and seems to be sturdier than the long handle at the back of the IBM portable.

The keyboard clips to the front of the machine in the time-honoured manner, while on the underside of the machine is a flap which allows it to be tilted for easier operation. At the rear is a door which covers the connectors and switches. Behind this is a serial port, parallel port, the power inlet and switch, and the keyboard connector. The space behind this door is large enough to store the keyboard cable, but not quite big enough to close with an Australian mains plug inside it. Also in this space are the composite and RGB colour video outputs.

The TPC II has an international power supply, a useful feature for computer industry people who are forever trotting about the globe.

The TPC II is based on the same architecture as the IBM PC and is extremely compatible. It comes with 256 Kbytes of RAM as standard, plus 16 Kbytes in the video graphics display. Although the display is a yellow phosphor type, the TPC II has video circuitry compatible with the IBM colour graphics adapter, and so an external monitor or TV set can be used to display colour graphics. There are no plans to produce a version with a built-in colour display.

Either one or two 360 Kbyte disk drives are supplied, which is adequate for most portable use.

The system already has one RS232C serial port, which is configurable for a variety of baud rates and handshaking protocols, and also has a standard Centronics printer port with the same DB-25 connector as the IBM PC. Thus there is not much a first-time user will want to add to the TPC II, but it does have a single full-length IBM PC compatible slot which can be used for further expansion. This is most likely to be used to add further memory, probably in the form of a multifunction card which will duplicate the internal functions already provided.

If further expansion is required, then the TS 1605E expansion box can be added, which provides a further six slots.

The important factor in the TPC II's favour is the quality of its construction and its aggressive pricing. It represents excellent value, IBM compatibility and a good solid feel. All in all, just a thoroughly nice machine to use. □

DICK SMITH'S BONDWELL

1984 was very much a year in which there were no major leaps forward, giving many manufacturers breathing space to refine their existing hardware and software further. A case in point is the Bondwell 14, a machine which has a well-known pedigree.

In 1981, Adam Osborne rocked the industry with his plans to sell a portable computer, complete with software, for only $US1495. In fact, he was slightly wide of the mark; when the Osborne 1 was released it was priced at $US1795 but was still astonishingly good value. About the size and weight of a sewing machine, it packaged a small screen, two disk drives, keyboard, CP/M computer and a swag of software in a way that a large part of the market found irresistible.

Later manufacturers have improved the recipe. Kaypro, for example, went for a larger screen and subsequently added a 10 Mbyte disk drive. Compaq has changed the basic machine to a 16-bitter with IBM compatibility.

Now comes the Bondwell 14, released here by Dick Smith Electronics. It's still based on the same basic formula, but it has been improved in numerous small ways that add up to a knockout.

In external appearance, it's similar to an Osborne Executive, with a two-tone grey plastic case. However, there the similarity ends. At the back of the machine is a flap which covers the on/off switch, IEC power connector, and the serial and parallel ports – there are no connectors on the front panel.

With external dimensions of 195 by 450 by 395 mm, and weighing 12.02 kg, the Bondwell is technically a transportable, rather than a portable, but you'd be hard pressed to make it much smaller.

The keyboard flips down in the time-honoured way to reveal a 23 cm, 80 by 25 amber screen with an anti-glare coating and, beside it, two half-height disk drives with a capacity of 360 Kbytes each. The keyboard has 63 keys, including four cursor control keys and 16 programmable function keys.

Behind that front panel is a Z80A CPU running at 4 MHz, with 128 Kbytes of RAM and 4 Kbytes of ROM diagnostics and

SPECIFICATIONS

BONDWELL 14

Made By:	Bondwell Corporation
Processor:	Z80A
Clock Speed:	4 MHz
RAM:	128 Kbytes in three banks
ROM:	4 Kbytes with self-test, and boot & monitor programs
I/O:	2 RS232C ports, 1 centronics printer port
Languages:	All CP/M languages
Keyboard:	63 keys and 16 function keys, numeric and cursor keypads
Display:	23 cm amber phosphor anti-glare monitor, 80 columns x 25 lines
Graphics:	
Peripherals:	
Expansion:	
Best points:	Nicely done
Worst points:	
Extras included:	
Options:	
Price:	$2295
Review unit from:	Dick Smith Electronics, Corner Lane Cove and Waterloo Roads, North Ryde 2113; (02) 888 3200.

bootstrap. The system has two serial RS232C ports and one parallel Centronics printer port, plus an unusual peripheral for a computer of this class – a speech synthesiser.

Software

Software bundled with the system is drawn from the Micropro 'Star' series and includes WordStar with MailMerge, CalcStar and InfoStar. The operating system is CP/M Plus, also known as CP/M 3.0, which offers higher performance than CP/M 2.2. For example, there's no need to type control-C when changing disks, and operating system utilities like the DIR and TYPE commands now page their output to give you a chance to read listings. A SPEECH utility allows files, written in a simple phonemic notation, to be dumped to the speech synthesiser.

It's difficult to put your finger on what's so good about the Bondwell. Rather than being any one thing, it's lots of little things which give you a good feeling about the machine. The speech synthesiser I could live without; its speech is quite good but I've heard better. On the other hand, it's very handy for reading back listings you've just typed in, to check your typing. I rather think it's the kind of thing you wouldn't give up once you'd started to rely on it.

The keyboard feels good – among the best I've tested and better than other transportables – and the screen is clear, sharp and big enough to be usable. Of course, there's a video output connector for a larger monitor.

A number of useful utilities is supplied with the Bondwell, including a pair of programs for file transfer through an RS232 cable between two machines. A SETUP utility allows the user to set up the RS232C port parameters, or set the drives to read IBM PC CP/M, Osborne double density, Kaypro or Spectravideo diskettes.

One of the best things about the Bondwell 14 is its price: $2295 including tax. That's got to be one of the best bargains in the computer marketplace right now, particularly bearing in mind the software supplied with the machine.

To sum up, then, the Bondwell 14 represents a high level of refinement in 8-bit transportable computers: high performance, quality software, better ergonomic design and just a feel of good quality all over. □

NEC APC III

Readers will recall that NEC *Information Systems Australia won the Personal Computer of the Year Award two years ago with its* APC *(Advanced Personal Computer). . . . .*

This year, NECISA is back in the running with the APC III, a machine which continues the high performance tradition of the APC, but in a format that is physically rather more like the IBM PC. While the original APC had the processor, disk drives and display all in one (fairly large) enclosure, the APC III has a much smaller system unit which is similar in layout to the PC. A monitor (colour or monochrome) mounts on top, and the keyboard sits in front. The new model is much more compact than the old one.

Despite the new physical format, the ▷

APC III does not conform to the modern ideal of IBM compatibility, except in a very general sense. In fact, it is more accurate to describe it as a generic MS-DOS machine. You can't simply plug in a PC-DOS disk and expect the program to work as though it were a PC, so the APC III is cut off from the mainstream of software. Nonetheless, NEC is attempting to ensure a supply of good software.

Like the Olivetti M24, the APC III offers a number of performance improvements over the standard PC. Its processor is an 8086 running at 8 MHz, so it will be at least twice as fast as the IBM PC. The first area where NEC diverges from IBM compatibility is in colour graphics: the APC III offers a graphics resolution of 640 by 400 in eight colours simultaneously. This is supported by versions of software specifically for the APC III, such as SuperCalc 3, a spreadsheet/database/graphics program which is broadly comparable to Lotus 1-2-3 (in fact its creators term it the Lotus Eater!).

More Disk Capacity than IBM

Disk drive capacity has been increased to 640 Kbytes on the Australian version of the APC III. While this eliminates virtually all hope of IBM compatibility, all is not lost; the APC can still read 360 Kbyte disks, so software or data files can be copied onto the higher-capacity disks. While this is fairly high for a 13 cm disk drive, many owners of the older APC will regret the move away from the 1 Mbyte 20 cm drives. For those who really need disk space, however, a 10 Mbyte hard disk can be built into the machine for only $2200, and another can be added externally. The basic machine comes with 128 Kbytes of RAM, and this can be expanded to 640 Kbytes. Other standard features include a clock/calendar circuit, built-in hard disk interface and a 90-key keyboard including 12 programmable function keys. An interesting option for the APC which is not yet available is a memory management board which will allow the machine to run a version of the UNIX operating system, supporting several users. This will open up a whole new area for the machine, as it will be one of the lowest-cost UNIX machines on the market.

The APC's construction is of high quality – thankfully it is not as heavy as its predecessor! NEC has paid attention to a number of little details, such as a cover to hide all the cables at the back of the machine. While the expansion boards for the APC III are quite different from those for the IBM PC, they are easier to insert and are better supported.

The Market

The original APC scored rather better with vertical market sales than with corporate buyers, who preferred the IBM PC with its ability to run Lotus. Instead, NEC's dealers added value to the machine by providing special software like vehicle fleet management programs, accounting systems and the like, appealing mostly to the small-to-medium-sized business segment of the market. In this area disk capacity is more important than compatibility, and the ability to run Lotus 1-2-3 is neither here nor there. We would expect the APC III to do well in the same markets, particularly bearing in mind its attractive pricing. For anyone looking for a machine to run vertical markets applications software, the APC III is well worth a look. □

SPECIFICATIONS : NEC APC III

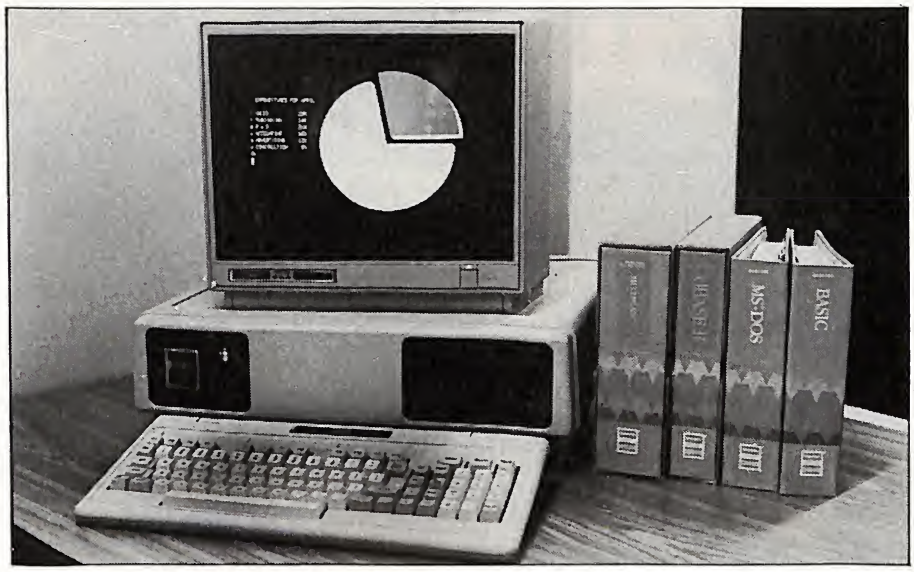
Made By:	NECISA
Processor:	8086
Clock Speed:	8 MHz
RAM:	Minimum 128 Kbyte, Maximum 640 Kbyte
ROM:	32 Kbyte
I/O:	1 serial, 1 parallel
Languages:	MS-DOS languages
Keyboard:	Numeric and cursor pads, 12 programmable function keys
Display:	35 cm colour/monochrome, 25 lines x 80 columns
Graphics:	640 x 400 resolution
Peripherals:	Spinwriter printer
Expansion:	Maximum 640 Kbyte memory, sound and games ports
Best points:	Low price and high performance
Worst points:	Not IBM compatible
Extras included:	Memory, colour
Options:	Software emulators for many IBM workstations and communications subsystems
Price:	$5895 retail inc. tax for 640 Kbyte memory, 10 megabyte hard disk and colour terminal
Review unit from:	NEC Information Systems Australia Pty Ltd, 99 Nicholson Street, St Leonards 2065; (02) 438 3544.

TANDY'S TRS-80 MODEL 2000

Tandy has been in the microcomputer business since the early days, and has released various models of the original TRS-80, as well as portables and colour machines.

Since the introduction of the first TRS-80 Model 1, Tandy has consistently ignored the standardisation taking place in the rest of the industry, around first the CP/M and later the MS-DOS operating systems. To be fair, Tandy's sales have assured it of a large enough base to justify the development of its own and third-party operating systems like TRS-DOS, NewDOS and LDOS.

However, that situation could not continue for ever, and with the TRS-80 Model 2000 Tandy joined the mainstream of the industry. Well, almost. It's unfortunate that at the time Tandy decided to go with the industry standards, the industry



moved from operating system standardisation to total hardware standardisation, opting to copy the IBM PC architecture.

Since the Model 2000 is based on MS-DOS but is otherwise mostly incompatible with the IBM world, Tandy's standardisation effort proved insufficient to bring mass market acceptance – a fault that is being rectified with the Model 1000, which is IBM-compatible. Nevertheless, the Model 2000 is a worthy machine in its own right.

New Processor

The Model 2000 was one of the first machines to use the Intel 80186 microprocessor – and is still one of the few. This chip uses the same basic design as the earlier 8086, but has been refined (that word again) in various ways.

First, some instructions, such as multiply, which were implemented in microcode (a kind of hardware subroutine) in the 8086, have been redesigned in random logic in the 80186. As a result they are much faster. Second, some of the support chips required with the 8086 have been moved onto the 80186 chip, improving their operation. And finally, some new instructions have been added to further improve performance.

The result of this is that the Model 2000 is the fastest personal computer we have benchmarked to date; it outperforms 10 MHz 68000-based machines by a significant margin. For out-and-out raw speed, there is nothing on the market to touch it. While this is of no consequence in word processing and similar highly interactive applications, for scientific number-crunching, software development and other processor-intensive applications there is a significant performance improvement.

Other things about the Model 2000 catch the attention. The floppy disks have 720 Kbytes capacity per drive, while an optional built-in hard disk has 10 Mbytes. Maximum memory capacity is 768 Kbytes – rather more than a standard PC.

An optional floor stand allows you to move the machine off your desk and onto the floor, while an optional monitor pedestal allows the display to be tilted and swivelled.

The resolution of the Model 2000's colour display is much higher than that of the IBM PC at 640 by 4090, while displaying eight colours from a palette of 16 (the IBM PC manages 320 by 200 while displaying four colours).

Good Software Selection

Tandy has made a reasonable attempt to obtain a good selection of software for this machine. All the Microsoft MS-languages are available, and for end users, there's the pfs series of applications programs, together with dBase II, the Microsoft applications Multiplan and Word, and more.

Of even greater interest is Tandy's announcement that it has signed with Microsoft for a colour version of MS-Windows. This kind of software really needs a high-performance processor and high-resolution colour graphics like those of the Model 2000 to work properly.

The Tandy TRS-80 Model 2000 represents the new wave of MS- DOS machines, with higher performance and better overall design. □

TANDY TRS-80 MODEL 2000

Made By:	Tandy Corporation
Processor:	Intel 80186 with 16-bit data path
Clock Speed:	8 MHz
RAM:	128 Kbyte expandable to 768 Kbyte
ROM:	
I/O:	1 RS232C, 1 parallel centronics port
Languages:	Assembler, Pascal, BASIC, FORTRAM, COBOL
Keyboard:	90 keys with twelve function keys
Display:	30.6 cm mono screen or 35.6 cm colour screen
Graphics:	640 x 400 resolution
Peripherals:	
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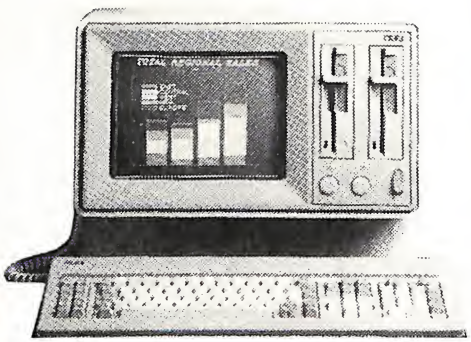

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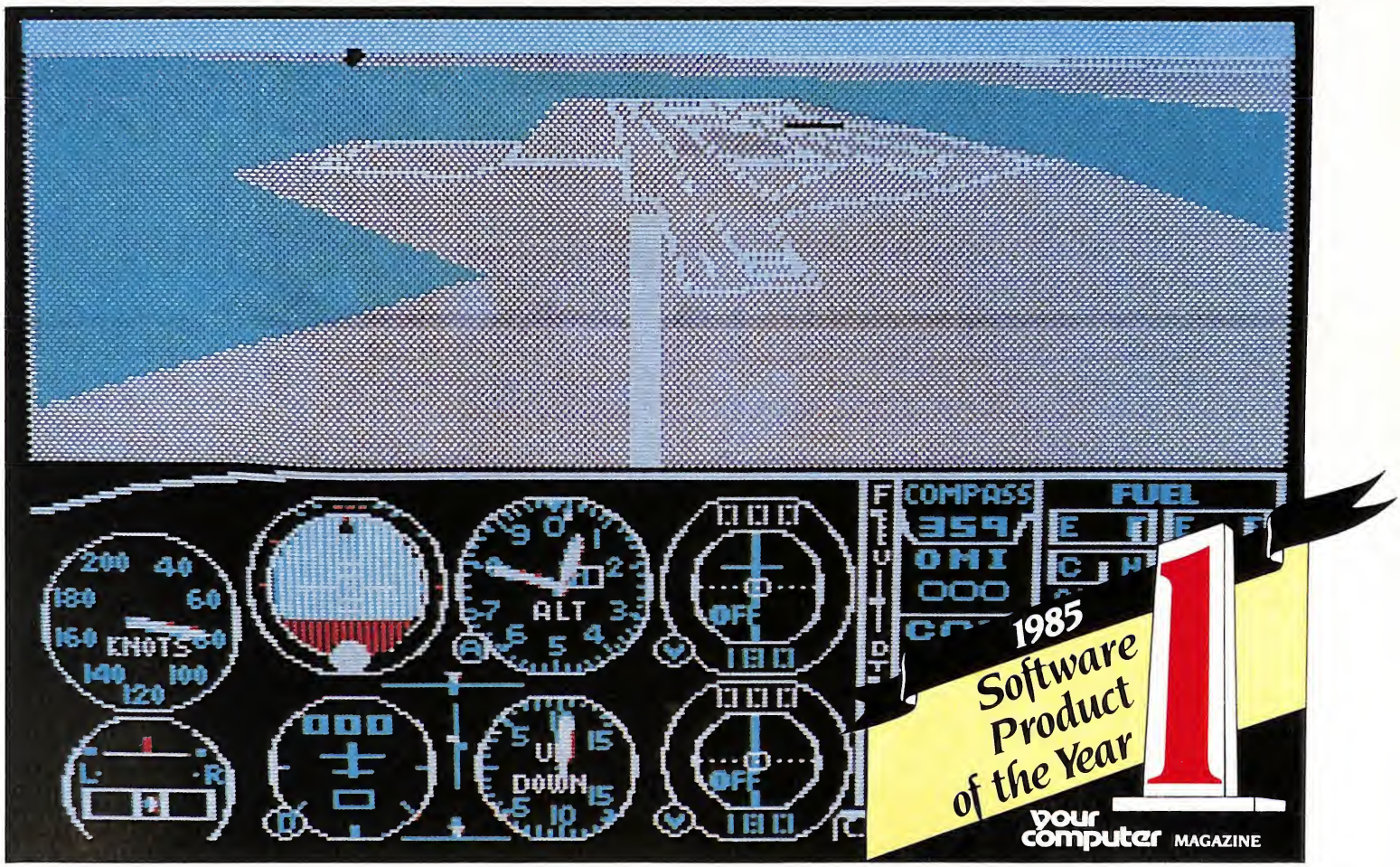
Microsoft FLIGHT SIMULATOR II



Originally written for the Apple II by Bruce Artwick of SubLogic, and then rewritten for the TRS-80 and other machines, Flight Simulator has now found its way onto the IBM PC. Microsoft has taken over the marketing of the program, leaving Artwick free to concentrate on the programming.

And what programming! Panelist Phil Grouse, no mean programmer himself, suggested that if there was a Nobel Prize for programming, Bruce Artwick ought to get it. By way of compensation, the panel awarded him the Software Product of the Year Award instead.

Piloting a Cessna

Flight Simulator II takes the pilot – I can't bring myself to write 'user' – on a simulated flight in a Cessna 182. The PC screen is split in two, with the bottom half show-

One of the problems of working full-time with personal computers is that one tends to become awfully serious about them, not to mention jaundiced and cynical about the latest gee-whiz products. Everyone seems to have yet another word processor or database program which they insist is the greatest thing since sliced bread, and in truth some of them are very good – they are unfortunately just one of many in the marketplace. Every now and again, though, you come across a product that really stands out, head and shoulders, above the crowd – the occasional program that simply has no competition. Microsoft Flight Simulator II is such a program. ▷

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ing the instrument panel and the top half the view through the windscreen. The landscape changes in response to the aircraft's movements, and objects are displayed with perspective changes and a good impression of solidity, regardless of the direction of view.

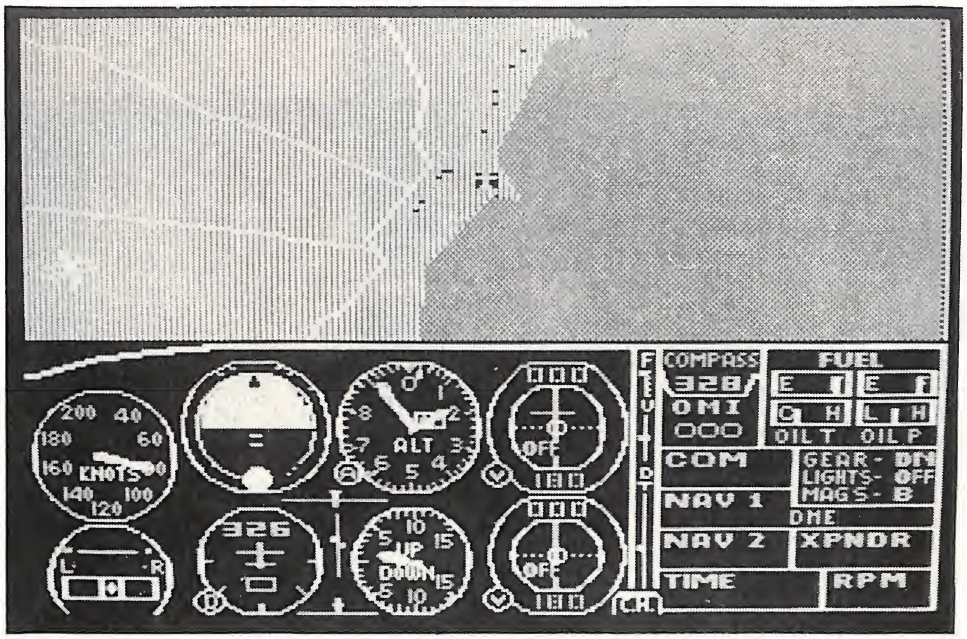
The keyboard becomes the controls of the aircraft. The cursor controls are pressed into service as a joystick, while the programmable function keys take the functions of flaps and throttle. The distribution of other controls is largely based on initial letters – for example, the G key raises and lowers the landing gear.

The program 'knows about' four areas of the continental US – the New York, Chicago, Seattle and Los Angeles regions – and over twenty airfields are modelled in the program. In many cases, landmarks around the airfields are also modelled, including the Manhattan area, which even includes the Empire State Building, the World Trade Centre, Central Park and the Statue of Liberty!

Take-off is accomplished in virtually the same way as in a real Cessna. Apply maximum thrust, taxi down the runway, and at around eighty knots pull the stick back – I mean, press the 2 key – and you'll come unstuck. Now press the 4 key, and you'll start banking to the left. Press the G key to pull the wheels up, and you're well and truly flying.

What's astonishing about Flight Simulator II is not that it does what it does; it's that it does it so well. Just managing a three-dimensional perspective display is complex enough, but the problem is reasonably well-defined. Yet this program goes well beyond this, adding simulation of weather conditions.

Two layers of cloud and three of wind are provided, with the ability to add turbulence in cloud layers. Twilight and night flying are both possible, as well as daylight visual flight.



Night Flying and Aerobatics

Obviously, to fly at night, instruments are required, and Flight Simulator II's display has a comprehensive instrument panel: as well as the standard instrument cluster – airspeed indicator, altimeter, directional gyro and so on – it also provides two omni-bearing indicators with glideslope, two navigation radios, distance measuring equipment and other instruments. Once the mechanics of taking off and landing (it doesn't seem so mechanical at first) have been mastered, the user's (player's? pilot's?) interest transfers to long-distance flights relying on instrument navigation.

Or alternatively, you might prefer to tackle aerobatics and other aerial manoeuvres. The system defaults to auto-coordinated flight mode: this links the rudder and ailerons so that turns are always perfectly coordinated. Remove this auto-coordination and the system becomes more realistic still; it is now possible to perform barrel rolls and other aerobatics (loops aren't too difficult, even before you've learnt to land – well, it's one way of getting down!).

As you fly, the instrument displays are updated, the window view (which can be in any of nine directions) is updated, and the performance of the plane changes. For example, as you fly higher, the rate of climb of the plane decreases until you reach its service ceiling.

It's possible to set up scenarios – flights in different weather conditions, for example – and store these on disk. In addition, the 'reliability' of the program can be decreased from 100 per cent, so that you will have to face various equipment failures in flight – your radio direction-finding gear might fail, for example, or your engine might cut out in mid-air.

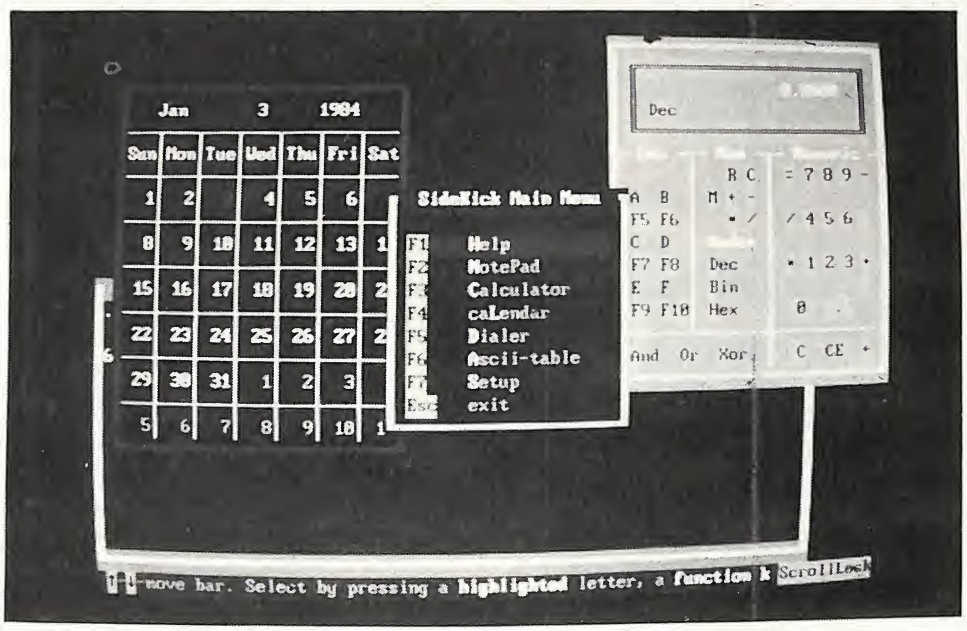
The whole system is remarkable. Even to seasoned programmers, the challenges of performing real-time simulation of an aircraft – including modelling its performance accurately – plus providing three-dimensional views are quite daunting. Most would deny that it was possible to implement such a program on an IBM PC – unless and until they saw this program. It is for this reason that the Award panel selected Microsoft Flight Simulator II as the Software Product of the Year.

Microsoft's Flight Simulator II was reviewed in detail in the February 1985 issue of Your Computer. □

MICROSOFT

Made by:	Microsoft
Hardware required:	IBM PC and close compatibles, with 64 Kbytes minimum memory (128 Kbytes if you want to use a mouse).
Price:	$95
Distributor:	Microsoft, PO Box 95, Forestville 2087, 1/17 Rodborough Road, Frenchs Forest 2086; (02) 452 5088.

SIDEKICK



Sidekick is a very ingenious package which extends the functionality and usability of the IBM PC *and clones. The underlying rationale of the package is the fact that most individuals work on a number of tasks at any time and their work pattern is subject to disturbance.* But PCs *don't work this way, and Sidekick overcomes this problem to let people work in the manner that suits them.*

The major reason why applications like diary/calendar programs and name and address files have never worked on personal computers is this: you always want to use such a program while you're running something else. To get the information you need, you have to close files and quit the current application, possibly change disks and then run your diary program. This is slow and unsatisfactory, and the fact is a book works better.

Now comes Sidekick, which is permanently resident in memory along with the operating system of the PC, and is therefore always available. Not only that, but it can be instantly invoked by simply striking the Shift and Alt keys simultaneously.

When started in this way, Sidekick produces a window in the middle of the screen which is its main menu. This reveals the applications which are built into the program.

Notepad

Probably the most generally useful of these is the notepad, which can (like all the Sidekick modules) be used at any time, from within any other program. The notepad implements a WordStar-compatible full-screen (if necessary) editor which can be used to write notes of any kind. These are then saved on disk for subsequent printing or editing.

The notepad has a couple of particularly neat features. The first is the ability to cut information out of the current PC screen and paste it into the notepad. I can see this would be a tremendously useful facility for software reviewers, among others! The other feature which is particularly useful is, if you start a notepad with .LOG, whenever you enter it, it automatically moves the cursor to the end of the pad, types in the date and time and then waits for your input. Great for taking phone messages, for example.

Other Modules

As well as the notepad, there are several other modules in Sidekick. Another particularly useful one is the calculator. This is very clever, with some ingenious tricks up its sleeve. Like the notepad, it pops up in its own window, and while its colour (yellow and white) is a little dazzling, it is still clearly visible. It functions just like a conventional pocket calculator, and can also calculate in hex and binary.

We particularly liked the ability to associate any result with any key on the PC keyboard, allowing you to do a calculation and then place the result in a spreadsheet or database without retyping it.

The dialler facility probably won't be much use to most people in Australia for a while yet, since it requires a Hayes Smartmodem-compatible modem (see the DataNetComm In/Modem for more on this). But if you do have such a modem, it adds a very useful facility. When the dialler is first invoked, it searches the screen for any string which resembles a phone number, and if it finds such a string, it offers to dial the number. After all such numbers on the screen have been offered and rejected, it then loads its own directory and presents it for perusal. Very natty idea: you can, for example, look up someone's phone number in a database, invoke the Sidekick dialler and dial the number directly without even touching the phone!

Also built into Sidekick is a calendar and appointments scheduler. The calendar is very neat; when invoked it pops up displaying the current month with 'today' highlighted. Using the cursor keys, it is

Made by:	Borland International
Hardware required:	IBM PC and close compatibles
Price:	$89.95
Distributor:	Software City, 1/27 Forge Street, Blacktown 2148; (02) 621 4242, (02) 671 6951.

possible to move forward or backward for months or years. Operation is instantaneous.

To use the appointments diary, just select a date by typing the day number (for example, for February 11th, type 11) and then hit return. That day's diary will appear, with entries possible at half-hour intervals down the page with a heading at the top. This is the default diary, the name of which is built into Sidekick as part of the installation process, but you can alternatively press F2 to enter the user's name or initials – for example, John Smith's appointments would be in a file called JS.APP.

Help for Programmers

The final major feature of Sidekick is its ASCII character set display. How often, when you're writing a menu program (for example) and you want to select the PC's line drawing characters, do you have to hunt for hours to find that funny little card that came with the DOS manual. With Sidekick you simply select the ASCII display and you can page through the PC's complete character set with values given in decimal and hex. Very handy.

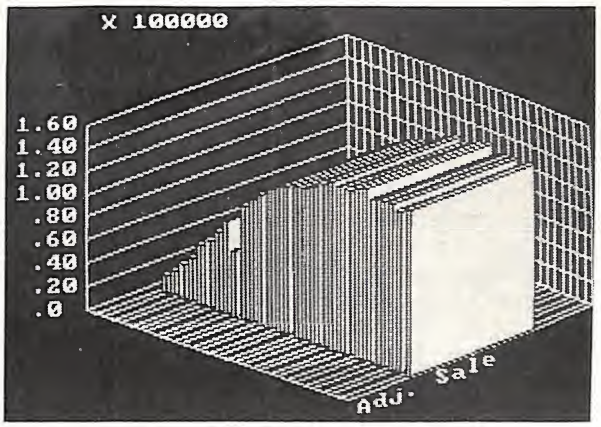
That's what Sidekick is – incredibly handy. It's not by any means a simplistic program; the notepad, for example, compares very favourably with WordStar, and there's an elegance of design about its operation. For example, all the windows can be moved around the screen by simply selecting Scroll Lock and then using the cursor movement keys. Copying material from the underlying screen onto the notepad is achieved using the same block mark and copy sequence as WordStar. There's very little to learn.

For all that it is an inexpensive (I won't say cheap) package, Borland International has not skimped on the documentation. This takes the form of a paperback book of almost 90 pages which gives a tutorial, reference information and useful hints.

The only problem the panel had with the program was with setting it up to access the appropriate subdirectories, but we eventually got that sorted out. A minor annoyance: while the appointments calendar is automatically written to disk after updating, the notepad has to be manually saved. Occasionally you'll switch off and erase your notepad.

All in all, Sidekick is an excellent product. It is useful, inexpensive, well thought-out and innovative. It came a close second behind Flight Simulator II □

OPEN ACCESS



Open Access, from Software Products International, has possibly the greatest contrast between its simple user interface and the powerful commands it offers, making it a top contender for the Software Product of the Year Award.

The Open Access user interface is deceptively simple, consisting as it does of menus displayed within menus, with context-sensitive help available at all times.

Open Access is written in Pascal, and is quite a large system; the programs occupy almost two entire disks. It is obvious that such a large program would not fit in memory, and so Open Access consists of overlay files on disk. In fact, SPI turns this into a virtue; by placing most of the code in overlays, the system can run on a 192 Kbyte PC, although it will perform better in a larger memory system.

In order to cope with large data sets, Open Access works with files rather than memory structures. While this slows the system down, it is also a virtue in that much larger data sets (spreadsheets up to 648,000 cells, for example) can be handled. In many ways, this emulates the virtual memory capability of mainframes and foreshadows the kind of designs we are likely to see on next-generation microcomputers which have support for virtual memory.

The OA user interface is very straightforward and easy to use, as the keys work in a consistent and straightforward manner – for the most part anyway. F10 always functions as the 'DO' key, and selections are made from menus by scrolling up and down using the arrow keys or typing the initial letter of the selection. Most importantly, the ESCape key also functions as an 'UNDO' key, which gets the user out of awkward situations. Often, the return key functions as a 'DO' key also.

Six Application Areas

Open Access provides six distinct applications areas: word processing, database management, spreadsheet calculator, graphics, communications and calendar management.

While the word processor can best be described as competent (in common with that of most integrated packages), the other parts of the package all have outstanding features.

For example, the spreadsheet display can be split into six windows and up to four spreadsheets can be displayed simultaneously. The additional models can also be explicitly linked into the main spreadsheet. For consolidation, the package offers a hierarchical consolidation scheme with up to seven levels, and each model may have up to thirty sub-models on the next level down. Another unusual feature is goal seeking.

The Open Access database or information management subsystem can be used in a simple browse mode or can be augmented through the design of screen masks, which can be used for data entry or enquiries.

For more complex queries, Open Access supports a version of IBM's Structured ▷

Made by:	Software Products International
Hardware required:	IBM PC and close compatibles.
Price:	$995
Distributor:	Software Suppliers Pty Ltd, 9 Avon Road, North Ryde 2113; (02) 888 1955.

Query Language, and it is interesting to note that the database is fully relational, unlike many PC packages which have made that claim in the past.

Reports can be quite complex, with two levels of subtotals, up to 16 header and footer lines and up to 160 columns in the report. The report generator also supports functions like sum, average, count, max and min.

The graphics facilities include all the standard formats such as bar and pie charts, as well as three-dimensional bar charts which can be tilted and rotated. Graphs can be saved as print images and included in reports.

The Open Access calendar management function looks somewhat similar to that in Sidekick, although its capacity is greater and it breaks the day down into ten-minute intervals. Finally, the communications facility provides terminal emulation and file transfer capabilities as well as unattended operation.

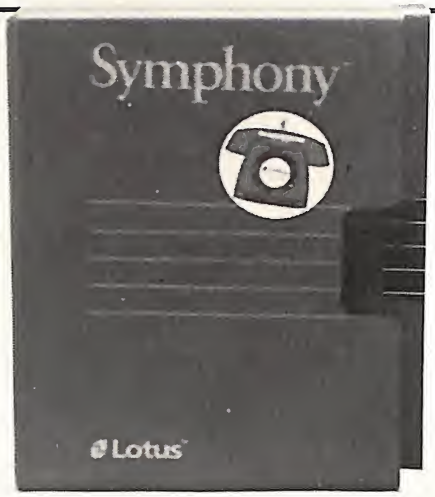
Still Developing

Open Access is undergoing continual development. The first version was widely criticised for speed problems, which were largely caused by its being written in Pascal and which were quickly solved by a new, more tightly optimised version. New versions are imminent which support networked operation, and the system is also being unbundled so that users can purchase only those functions they need.

Further developments are just around the corner. Some of the features we criticised in an earlier review (YC, December 1984) have been attended to, such as the addition of Christensen protocol to the comms module, as well as Kermit protocol, a first for an integrated package. Other enhancements include an optional statistics module which can perform all kinds of complex statistical functions, many of which we'd never heard of, so it must be powerful, and a user language which is considerably more powerful than the current macro facility.

Open Access does not come from a company with an established reputation, so nobody can feel disappointment about its performance compared to a previous product. Instead, it seems to be quietly building up quite a reputation of its own. It's a solid product with some features that competitors will have trouble emulating for some time to come. A worthy program for the Software Product of the Year shortlist. □

SYMPHONY



Lotus 1-2-3 won last year's Software Product of the Year Award, but the company was already developing its new integrated package, Symphony, by then. Symphony expands and develops the concepts that were so successful in Lotus, and adds word processing and communications functions for extra power. Is it as brilliant as the original Lotus?

Lotus Development Corporation scored a major hit with Lotus 1-2-3. In the first year, the company recorded sales in excess of $US50 million, which is a lot of copies of the program. So successful was the program, so much better than the competition, that last year, *Your Computer* awarded it the Software Product of the Year Award.

One of the golden rules of this world is that when you have a successful formula, you don't tamper with it. So in working on their next product, the company's designers set about expanding 1-2-3 to provide added functionality. Whether the resulting product, Symphony, is a success, depends to some extent on your point of view (for a detailed discussion of Symphony, see *Your Computer*, December 1984). Those whose primary interest is not in financial analysis will possibly have mixed feelings, but the financial people who jumped at 1-2-3 have adopted Symphony strongly.

Five Functions

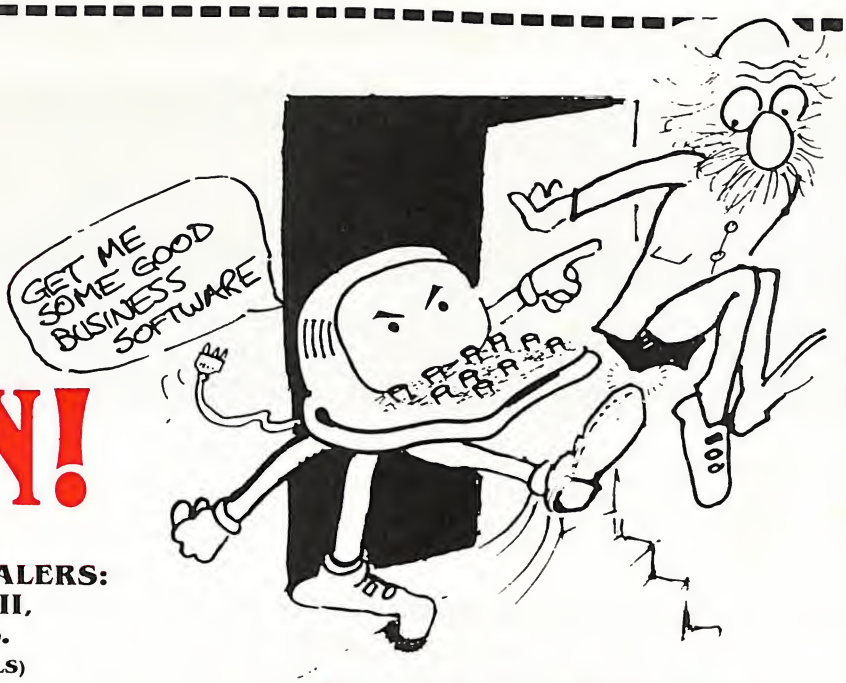
Symphony is organised very similarly to 1-2-3, using the same menu-driven approach and offering the same features. In fact, although it offers five separate functions – spreadsheet, graphics, database, word processor and communications – each with its own window, underlying them all is the spreadsheet, betraying Symphony's lineage.

The Symphony spreadsheet is basically the same one as is used in 1-2-3, with similar menus and only minor differences. The experienced 1-2-3 user will have no trouble adapting. However, while 1-2-3 has only one menu tree, Symphony has several. Each window type has a different command menu, and there are five corresponding types of work environment: SHEET, GRAPH, FORM, DOC and COMM. These are all accessible from the Services menu (F9). Windows can be resized, moved, split into panes, brought to the front of the stack and generally manipulated.

Symphony's graphics are very much in the 1-2-3 mould. From the spreadsheet it is possible to issue a graphics command to plot a set of figures in very much the same way as 1-2-3, but there are more options and better control of labelling, scaling and so on. It is possible to pick up labels from the spreadsheet, for example, by prefixing the co-ordinates with a backslash. ▷

Made by:	Lotus Development Corporation
Hardware required:	IBM PC or compatible
Price:	$1095
Distributor:	Imagineering, 579 Harris Street, Ultimo 2007; (02) 212 1411.

IT'S ON AGAIN!



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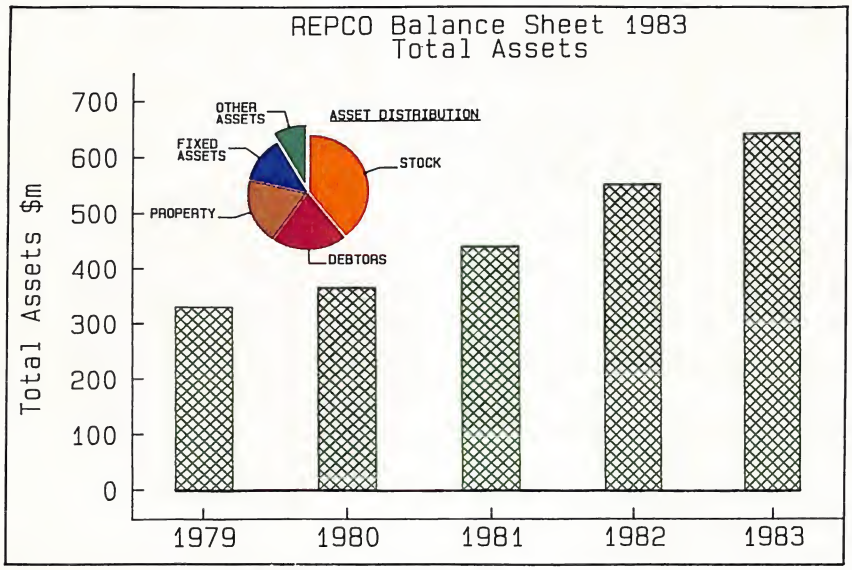

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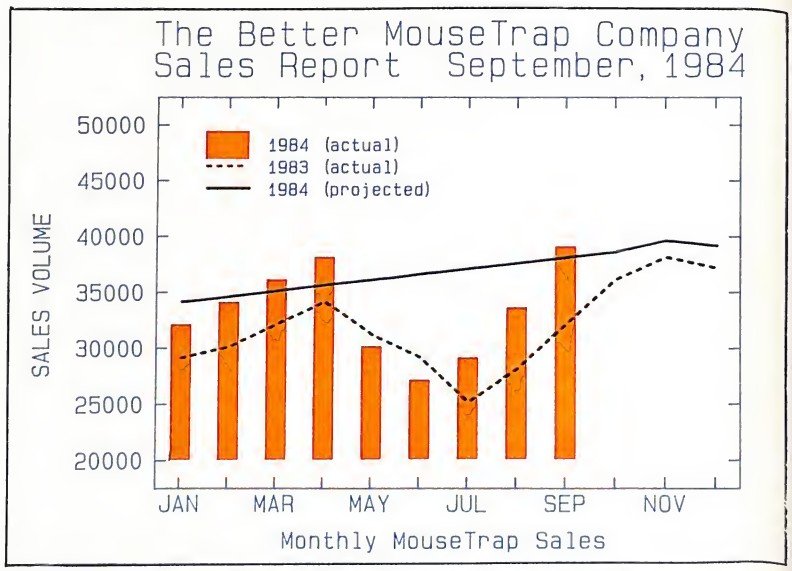
Graftalk is easy to use
Even a first time user can produce a sophisticated graph with a few simple commands. As you gain more experience, you can choose to use any of GrafTalk's more than 100 commands. Commands are available that allow all degrees of "fine tuning" for your graphs.

GrafTalk has excellent documentation
GrafTalk's documentation is readable, complete and easy to use. The User's Manual consists of full color examples designed to show you step-by-step how to produce the graphs you want. The Reference Manual classifies and describes fully every available command.

Chances are it works with the hardware you already have.
GrafTalk runs on CP/M-80 systems (even those without screen graphics), the IBM-PC, Sirius, DEC Rainbow, Zenith Z100, and many more. 16-bit systems need only 128kB of memory.
GrafTalk drives so many screens, plotters, and printers that we don't have room to list them all. Development is continuing — watch for the release of support for Apricot and the Textronic color ink-jet printer.

(Charts shown here were produced with Houston and Hewlett-Packard plotters, on a Televideo 803.)



UPDATE MONTHLY REPORTS QUICKLY AND EASILY

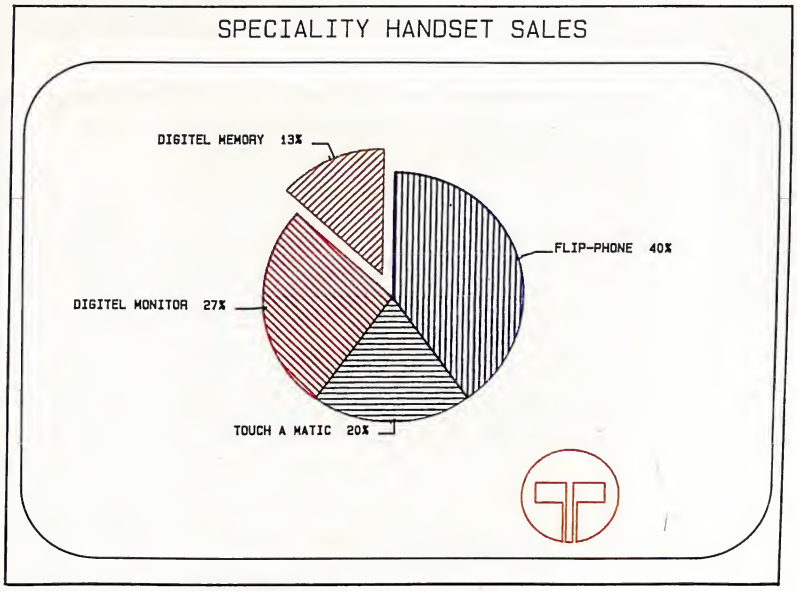
GrafTalk is a trademark of Redding Group Inc.
CP/M is a registered trademark of Digital Research.

Features of GrafTalk

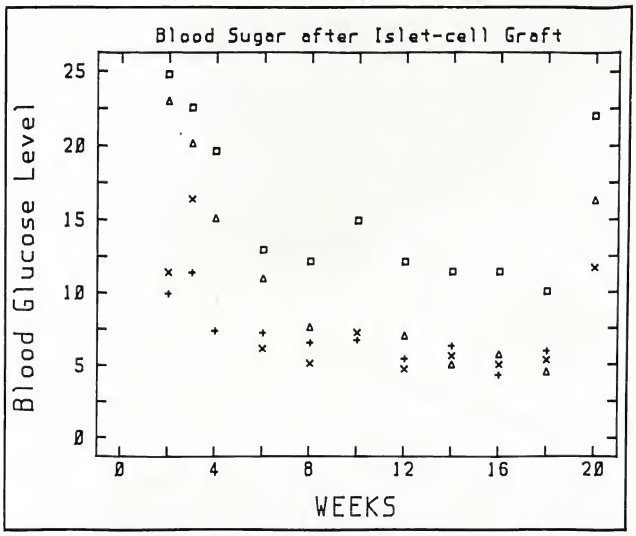
Flexible Data Input
GrafTalk will extract data from any text file, including Printer files from most spreadsheet programs. Blank lines and headings are ignored. Unwanted data can be easily masked off. Commas, dollars signs etc do not affect the interpretation of data values.

Mini Spread Sheet
The inbuilt spreadsheet allows the user to view and adjust data, perform arithmetic operations, create new rows and columns, name rows and columns,create sub-sets, and output data to disk or printer. Unassigned values are allowed.

Menu Mode
High-speed screen oriented menus are provided. Write your own menus for your standard operations. Switch between menu mode and command mode at any time.



ADD LOGOS WITH MOVE, DRAW AND ARC COMMANDS.



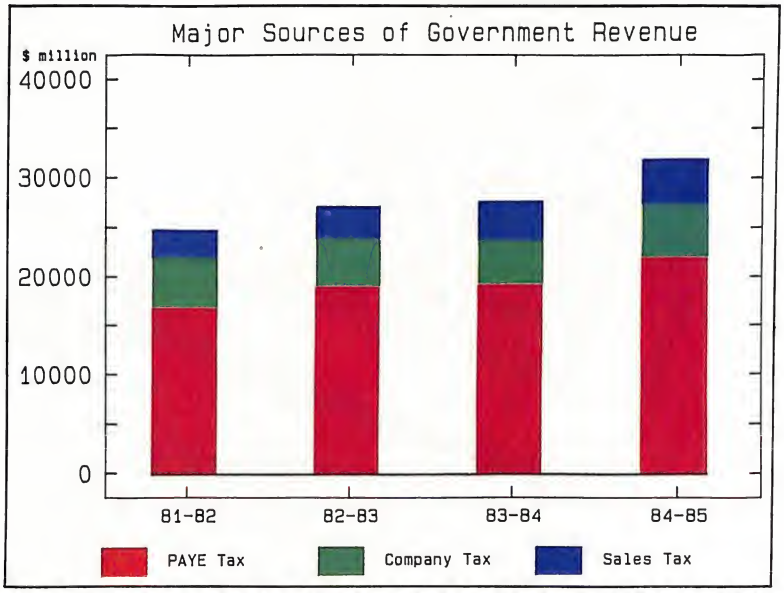
SUITABLE FOR BOTH SCIENTIFIC AND BUSINESS APPLICATIONS.

Axis Features
Adjust the number and position of axes. Select numeric labels, or text or special labels such as months, days or years. You can use automatic scaling, or nominate the range for each axis.

Interactive Graphics
Use the joystick, mouse, or light pen to select a region on the screen, and position legends and text.

Advanced Features
Declare variables, interactive sketch commands, circle and arc, absolute and relative moves, draws and marks, screen or graph coordinate systems.

Editor
The powerful screen-oriented text editor within GrafTalk is a very valuable tool for developing graphics. It can be used to create files containing commands, data or both. The editor has commands to allow you to run all or part of a file. If errors are found during execution, GrafTalk returns to the editor, with the cursor pointing to the offending line.



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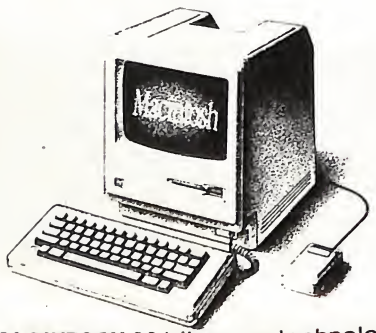
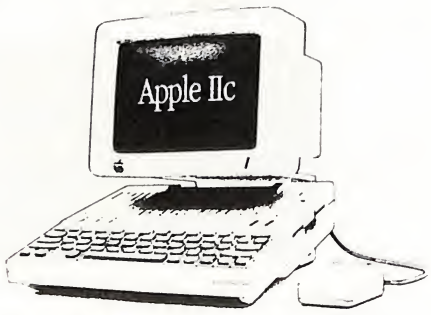


MACINTOSH 32 bit mouse technology includes MacPaint and MacWrite – Imagewriter Printer optional.



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Graphs appear in a separate window, which can be left at its original small size or blown up to fill the screen, and the graphics commands have generally been enhanced.

The word processor, as is the case with the other applications, actually operates on the spreadsheet. Changing the type of the window to DOC makes the word processor commands effective, allowing the underlying sheet to be treated as a word processor document.

Symphony expands on the 1-2-3 database concept. It's still not a database in the sense that a dBase user would expect; rather it's a set of commands for sorting and manipulating a range of cells in the database.

Symphony adds a new level of functionality, however, in the ability to create and use screen forms, rather like those of dBase II and other database managers. As you would expect from a spreadsheet program, the definitions of these forms are stored in tables in an area of the spreadsheet.

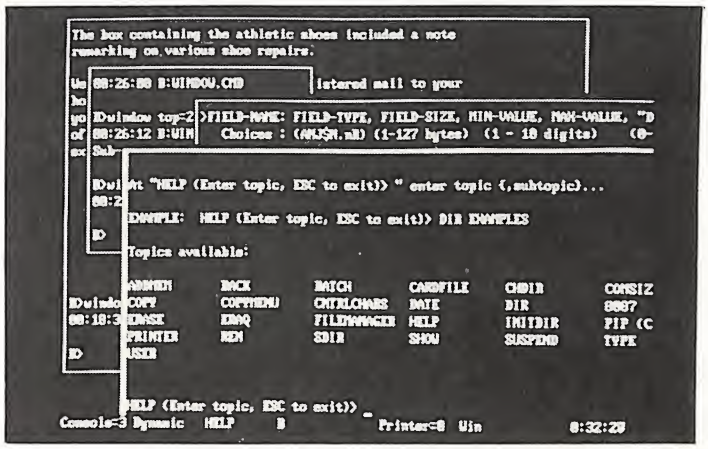
The screen design is defined in a database range, which contains the names, types and values of each field, as well as edit/validation rules, default values and formulas for derived fields. When you fill in a form, the current record values are temporarily stored in the entry range, validated and processed against the rules in the entry range, and then transferred to the database range.

The Symphony communications module is able to emulate a standard 'glass teletype' and is also able to handle file transfer using the Christensen protocol. By using a special menu selection, the user can initiate automatic log-in sequences, with programmable delay times, to handle all the messy and time-consuming dialogue that takes place with remote systems when you first log in to them

The most important point about Symphony is that all activity takes place on a single worksheet in memory, which is saved and reloaded as a single entity. This means that context switching is much easier, and that the user interface is consistent, if complex.

While some 1-2-3 users have been disappointed by Symphony, this is probably because in handling vastly more commands the package has lost the simplicity and purity that was evident in 1-2-3. Considered in its own right, Symphony does a good job of providing a powerful set of data manipulation services. □

CONCURRENT CP/M



It's hard to believe that CP/M *has been with us for ten years now. Concurrent* CP/M *Version 3.1 has added a windowing capability, and offers many other improvements over past versions.*

Since CP/M first appeared it has grown from a simple software development environment into a family of single- and multi-user operating systems for a variety of processors and over 1000 different kinds of computers. The various different versions of CP/M also use the same basic file system, enhanced over the years to provide additional facilities like date and time stamping and faster directory access, making it possible to upgrade with minimal pain and anguish. And all the time, greater and greater functionality has been added to the user interface. With the advent of the IBM PC, CP/M has been displaced as the basic operating system for personal computers. Yet new versions have continued to appear, and, as a family of products, CP/M is far from dead.

Latest Contender

The latest operating system to join the family is Concurrent CP/M Version 3.1 with windows (a later version, Concurrent DOS 3.2, appeared too late for inclusion in the Awards). It's important to stress that, like the earlier versions of CP/M, Concurrent CP/M is basically device-independent and can run on a variety of machines – we have it on the IBM PC and Compupro systems – but that the version discussed here is principally for the IBM PC and close compatibles.

Concurrent is a big operating system – at 112 Kbytes it's almost five times bigger than PC-DOS – but you get an awful lot of performance in exchange for giving up that memory space.

At the heart of CCP/M is a real-time multi-tasking monitor (RTM) which is able to switch the processor between programs 60 times per second or so. By doing this, it is able to give the impression that several programs are executing at the same time – which is, in effect, what is happening. CCP/M is able, theoretically, to support up to 256 simultaneously exe- ▷

Made by:	Digital Research Corporation
Hardware required:	256 Kbytes minimum memory. Works best with a hard disk.
Price:	$465
Distributor:	Arcom Pacific, 252 Abbotsford Road, Mayne 4006; (07) 52 9522.

cuting programs, or processes as they are properly termed; but in practice they would need to be very small processes to fit into memory. Not only that, but how would a user keep track of them? So in practice, the IBM PC version of Concurrent supports only four programs at one time (other implementations, in particular multi-user ones, can handle more).

In order to cope with the kinds of full-screen programs typically found on personal computers, CCP/M handles switching between programs in a rather different way from systems like UNIX. The user has four 'virtual consoles', which can be selected by pressing the control key and the 0, 1, 2 and 3 keys on the numeric keypad. The screen will instantly switch between the different programs, just like changing channels on a TV!

Now, Concurrent CP/M 3.1 goes beyond this by adding windowing facilities. By using the WMENU program, the user can place the four virtual consoles on the screen at the same time, in windows which can be resized and moved around. In general, CP/M-86 programs are well-behaved enough not to interfere with the windowing, and the result is very impressive.

There is a number of other features which make Concurrent much better than previous versions of CP/M: vastly improved documentation, including absolute beginner-level tutorials; faster disk access; menu-driven utilities for device configuration and disk formatting; 8087 support; shared code support; password protection for drives and files; memory disk drive; and support for networks under DR/Net.

Concurrent CP/M can be set up (by system implementors) for either single- or multi-user operation, and so CCP/M has replaced MP/M as the standard multi-user operating system for machines like the ICL PC and Compupro systems.

Already, Concurrent CP/M for the IBM PC has been upgraded to Concurrent DOS 3.2, which supports PC-DOS programs and can read and write DOS disks, including sub-directories. In addition, Concurrent CP/M-68K for the Motorola 68000 processor has been shipped, and a windowing version for the Lisa has existed for over a year, although it was never marketed (sob, sob!). DRI is also preparing to release CCP/M-286, for the Intel 80286 processor, and this is believed to be still more sophisticated. □

R:BASE

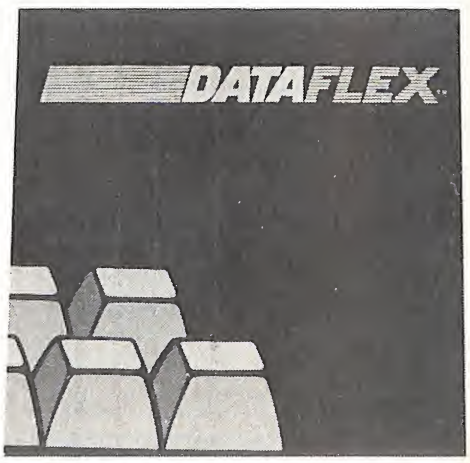
As readers know, we take a particular interest in database packages. This is because the magazine would not run without them. We were therefore particularly pleased when one of the panel members, who had been using R:base for some time with great success, nominated the package for inclusion in the shortlist.

Three versions of R:base are available: Series 2000 is a menu-driven package designed to meet the needs of occasional users, and consequently the focus of this version is on ease of use. Series 4000, the most prevalent version, is a single-user relational database package, while Series 6000 is a multi-user version for use on networks. A particularly interesting option for R:base 4000 is CLOUT, which stands for Conversational Language Option.

R:base is considerably more powerful than most personal computer database packages, although this does not mean it is difficult to use. On the contrary, it seems considerable attention has been paid to making R:base's operation logically and rigorously correct, allowing the implementation of large systems while still making it easy to use. R:base pioneered the menu-driven construction of command lines that has since been added to dBase and other packages.

DATAFLEX 2.0

DataFlex 2.0 is a versatile software development package much praised by its users – which seemed a good reason for it to make the shortlist for Software Product of the Year.



Dataflex 2.0 is perhaps not as visible to most of our readers as some of the other short-listed products. This is because, firstly, DataFlex is new to the Australian market, and secondly, because it is a program development package of most use to business programmers rather than end users

Having said that, it is worth pointing out that this does not mean DataFlex is of

Commands

When first loaded, R:base signs on with an ornate copyright message, then produces its R> prompt and is ready to accept input. The command line, which can be up to 1600 characters long, is similar to IBM's SQL (Structured Query Language). Commands are English-like, such as:

SELECT CONAME FROM ORDERS SORTED BY AMOUNT WHERE STATE = 'NSW'

Because of the length of the command line, queries can be almost arbitrarily complex.

R:base operation is based upon the data dictionary, which contains information about the database and its contents. Unlike, for example, dBase II, an R:base database may comprise up to 40 files, called relations. A database can have up to 400 fields, known as attributes, and the row (record) size of a particular relation can be up to 1530 characters. For those who contemplate having large databases, the maximum relation size of 2.5 billion rows is tempting. This equates to a maximum number of rows per database of over 100 billion.

The data dictionary also contains rules for data validation and passwords, which can apply at both the database and relation level. A personnel database, for example, might have password protection

no use to end users. It could be that a lot of people out there who are struggling to write programs in dBase's applications development language would achieve better results by sitting back and letting DataFlex write the programs for them.

Packages like dBase, R:base and others are something of a half-way house in the computer world. On the one hand, they include an interpretive command language which allows an end user to directly create and update databases and type in simple queries, produce reports, and so on. On the other, the language can be used to produce turnkey applications systems ranging from video rental packages to conference administration programs.

DataFlex leans to the latter approach; it is not possible to walk up to the system and start using it interactively. On the other hand, DataFlex is near ideal for development of turnkey applications. Originally DataFlex consisted of a set of routines written in Pascal MT+, which were linked together to produce the final program in a kind of 'programming by numbers' exercise.

Autodef

This approach works quite well for small, simple applications. In particular, DataFlex makes it much easier through the use of several programs which actually generate the programs as series of numbers. One, called Autodef, can virtually completely write an application program with no human intervention.

Using any ASCII screen editor, the user defines the data entry and editing screen for the target database. Field types, numbers of decimal places and screen layout are defined at this stage, and then the file is saved. The Autodef program now reads the screen layout file and asks the user a series of questions about the database organisation – in particular requesting information about index key fields which cannot be deduced from the screen design.

Autodef now goes ahead and creates the data file, index files and the data entry and editing programs, which basically consist of calls to the required subroutines for screen handling and other activities. The programs are now compiled, and the first prototype of the application program is up and running.

This first cut at the programs may be crude, but it is quick and simple to get a program actually operating, and gives the intended user his or her first experience with the program's behaviour. It also allows data entry to begin while development continues in parallel.

Relational Database

The next stage is to expand the database definitions by making use of DataFlex 2.0's more powerful facilities. For a start, it is a true relational database, so the database can be normalised to permit efficient storage and increase the complexity of reports.

The relation facilities of DataFlex provide automatic linking of database files to ▷

so anyone in the personnel department can have access to it, but the salary relation might be further protected so that only key people can examine it.

The database query facility, which is based on the SELECT keyword above, is quite powerful, allowing summing of attributes, columnar formatting, sorting of output on up to ten fields, plus conditional selection with multiple conditions.

The R:base report generator allows reports to be designed using a full-screen editing facility to locate attributes and calculated variables. In addition, it allows the insertion of headers and footers on each page, the calculation of derived variables such as totals or averages and the insertion of text anywhere in a report.

Since it is a relational database, R:base offers a number of commands for combining information in database relations. These include INTERSECT, which outputs the intersection of two relations; UNION, which combines relations; SUBTRACT, which is the opposite of INTERSECT; PROJECT, which allows extraction of information; and JOIN, which combines matching rows from two relations. When combined with the reporting facilities, these relational commands are particularly powerful.

R:base is fully programmable in much the same way as dBase, with a broadly similar command language. However, the R:base commands and database structure are much more powerful, so programs should be shorter and faster.

Carries some Clout

CLOUT, the Conversational Language Optional Utility, extends the R:base SELECT verb, which is the most versatile reporting option. CLOUT starts with a vocabulary of 300 commonly used words such as maximum, minimum and list, plus the attributes named in the data dictionary. The user can extend this by adding another 500 words or phrases per database.

A CLOUT request could look like this:

WHICH PRODUCTION WORKERS HAD LESS THAN 20 TOTAL TRINING HOURS IN 1983?

assuming that CLOUT's dictionary contained a definition of the phrase 'production workers' and that it also knows the limits of the time period 1983. It will notice that the word 'training' is misspelled and will check through its dictionary for the likely correct word, then respond:

By 'TRINING' did you mean 'TRAINING'?

The dictionary already knows a lot of phrases, making it quite usable from day one. For example, the user can specify sorting by using such phrases as 'for each', 'broken down by', 'alphabetically', 'in terms of' or any of over twenty other phrases.

Apart from the processing of requests in English, CLOUT is for the most part menu-driven. Actions such as amending dictionary definitions, adding synonyms and generally tuning up the CLOUT dictionary are all menu-driven. Various options allow setting of parameters, such as specifying exact matching on certain fields.

CLOUT is an excellent example of what is possible using even quite modest artificial intelligence techniques – although when I say 'quite modest', bear in mind that no-one else has released anything quite like this.

R:base is a very impressive database management system. It can handle large or complex tasks which would stop less powerful packages. With the addition of CLOUT it is quite dazzling. □

Made by:	Microrim
Hardware required:	IBM PC, or close compatible, with 256 Kbytes of RAM; two double- sided, double-density floppy drives
Price:	$630
Distributor:	Imagineering, 579 Harris Street, Ultimo 2007; (02) 212 1411.

allow multi-file data entry and editing on a single screen, minimising the repeat of entries in files and saving space.

The report generator uses the same concepts as the screen code generator. The REPORT macro allows the generation of multi-line, multi-file reports basically by drawing the report layout on the screen. Ad hoc queries can be phrased through the use of a query program whose operation is completely dependent on prompts and provides the user with online assistance.

Full Programming Language

For more complex applications still, DataFlex 2.0 offers a true programming language which is much more powerful than the simple 'programming by numbers' scheme used at first. The command language is very powerful, providing advanced facilities for running other programs, accessing operating system functions, complex screen handling and other functions which are more like a general-purpose programming language. The language supports structured programming precepts through the use of commands like REPEAT ... UNTIL, WHILE ... END and others.

Among the most interesting capabilities of DataFlex is its ability to read and write conventional sequential text files, complex string-handling functions and sophisticated error-handling through the use of a status line.

A major bonus for DataFlex users is the variety of operating systems it runs on. It supports the entire CP/M family (single and multi-user, 8-bit or 16-bit), plus MS-DOS and a variety of networking enhancements to those operating systems. Generated applications are therefore easily portable between machines. Particularly important is the support for multi-user systems, including both record and file locking and the ability to manage peripherals.

From all the reports we have had from DataFlex 2.0 users, the package is excellent for software development. Users report improved productivity and reliability over the programming tools they were previously using. Since the world needs more software and better software every day, and good tools are the exception rather than the norm, we figured that was a good reason to put DataFlex 2.0 on the shortlist. □

Made by:	Data Access Corporation
Hardware required:	All popular machines
Price:	8-bit single-user – $950
Distributor:	Intelligence Australia, 60-64 Shepherd Street, Chippendale 2008; (02) 699 3877. And Australian Microcomputer Solutions, 248 Latrobe Terrace, Geelong 3220; (052) 21 1300.

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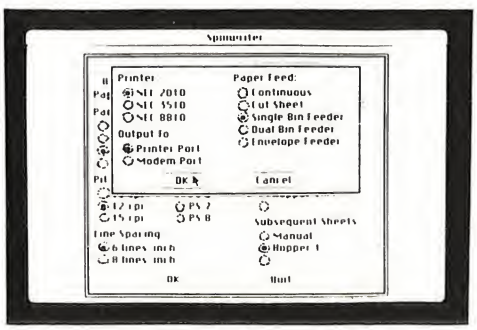

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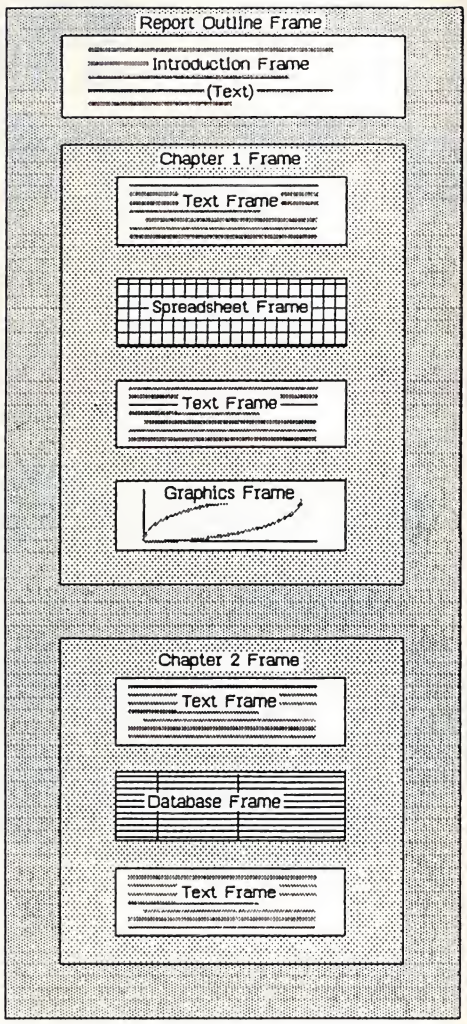
FRAMEWORK

The major challenge of integrated software packages is not cramming as many functions as possible into the program, but providing a reasonable set of interlinked functions in such a way that the user is not intimidated by the resulting complexity. Framework addresses this requirement particularly well.



Despite its power, it doesn't take weeks to do anything useful with Framework, and the user isn't required to study for hours before starting to use the package. This doesn't mean Framework is simplistic; its built-in language, FRED, is capable of tasks which would normally require programming in a general-purpose language.

Framework provides five key functions – spreadsheet, graphics, database, word processing and communications – together with a supporting structure for hierarchically organising work, and the FRED (FRamework EDitor) language, which can be used to automate repetitive or complex tasks.

It is the user interface and framework concept which breaks new ground in this program. Each new document the user creates is displayed in a frame – other programs refer to it as a window – and multiple documents can be worked on at one time. This concept is not new; last year's Personal Computer of the Year, the Apple Lisa, uses this idea. But Framework takes it one step further, by allowing the nesting of frames inside each other, in outlines.

The outlining processor allows the user to create the structure of a document or report before filling in the content, helping to assure a better-organised product at the end.

Framework's user interface is also very straightforward and easy to learn, being loosely based on the Lisa/Macintosh pull-down menu blinds. By striking the INS key, the user causes a menu blind to drop down, and the left and right arrow keys now control which menu is visible, while the up and down arrows make the selection within a menu. All options are thus visible on the screen and no command language needs to be learnt.

Deceptive First Impression

The initial impression the user receives is that Framework is not very powerful; spreadsheets when first created are limited to a particular size, as are databases. However, these are simply defaults which are required to assist with memory management, and can be altered as required. In fact, much of Framework is user-customisable, down to the speed with which frames are expanded on being opened from the desktop.

Each of the Framework applications is quite adequate in its own right. The word processor is more than sufficient for executive use or heavier report writing, while the spreadsheet – particularly when supplemented with the FRED language – should be adequate for most financial analysis and similar applications. Framework's graphics are quite powerful, though not quite in the same league as specialised graphics packages.

Framework's database is perhaps less powerful than one might expect from a company like Ashton-Tate, which has, of course, a long connection with database management. Bear in mind, though, that Framework is really complementary to the two dBases and the packages work well together.

In communications, Framework scores well, through the decision to bundle the highly respected MITE terminal emulation program into the package, rather than try to write special code. As a result, Framework communicates brilliantly.

Overall, however, it is the FRED language that ties everything together. Using Framework, it is possible to write routines to – for instance – ring a remote database, log in, request data for downloading, then log out and hang up, extract summary information from a local database, plug both sets of data into a spreadsheet and produce a report detailing budget vs actual, finally producing a graph of the figures and printing the whole lot.

Framework demonstrates a neatness of conceptual design, with every indication that it is not a committee effort.

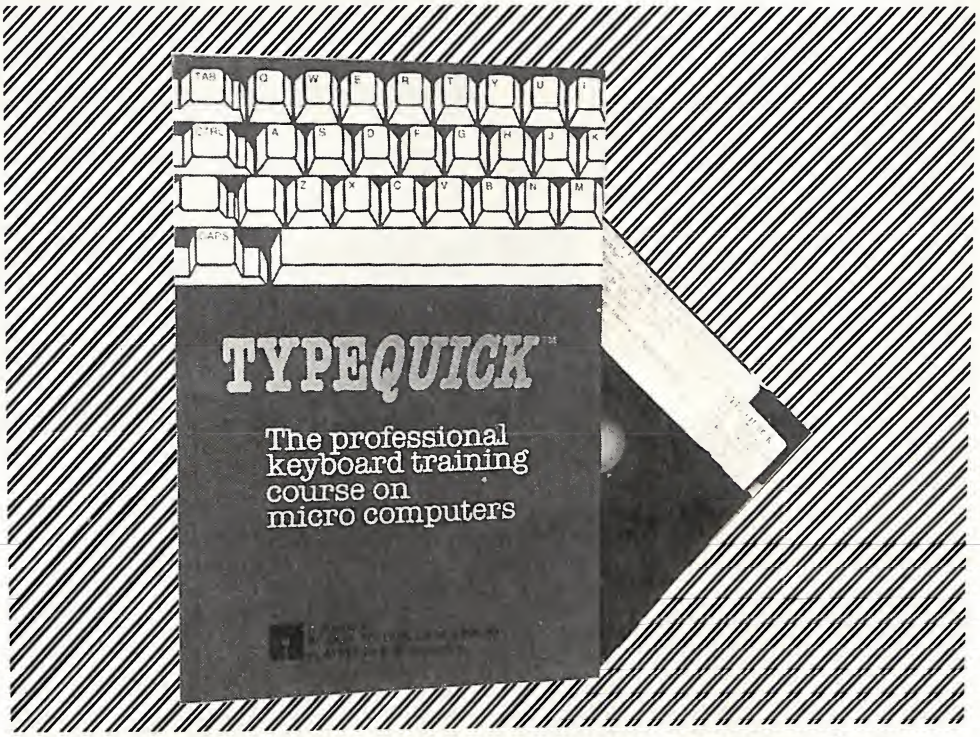
We foresee an excellent future for Framework; by virtue of its fully programmable nature and the richness of the FRED language, it will probably not be long before we start seeing off-the-shelf software packages written in FRED, and Framework consultants who will implement systems as required, in much the same way as currently happens with Lotus – but on a larger scale.

See Your Computer, *December 1984, for a detailed review of Framework.* □

Made by:	Ashton-Tate
Hardware required:	IBM PC and close compatibles.
Price:	$995
Distributor:	Arcom Pacific, 252 Abbotsford Road, Mayne 4006; (07) 52 9522.

COMMENDATION

TYPEQUICK



Typequick, written by AID Systems Pty Ltd in conjunction with Blue Sky Industries, a specialised C software house, is a keyboard tutor which is much more effective than similar packages.

The difference is principally in the design of the program, rather than the programming, and particularly in the psychology of learning. The manual stresses some of the psychological pointers which will assist learners, such as making a personal commitment and setting aside time specifically for the course.

Several key features have been incorporated into Typequick, which give it an edge over the competition. First of all, the drills it gives the student to practice are, as far as possible, conventional English words and not nonsense character strings. This is far better for the student, as an hour of typing lines like

agsad jlk;j a;dks dkfls fjkdl fkdls sjdks

is enough to make anyone give up. The Typequick approach is much better.

Motivation

Next is the idea of motivating the student. Most typing tutor programs simply record the student's keystrokes, and then give an error count and an average speed measurement. Typequick is much more sophisticated. It actually times each character and keeps timing buckets for each letter. As a result it is able to identify which characters are giving the student difficulty and modify the lesson plan accordingly, to exercise those keys.

Part of the motivation aspect also involves setting a target speed and reporting at the end of each exercise which keys the student is now using at the target speed or faster. This gives the student feeling of achievement that is missing in some courses where no progress is apparently being made.

Typequick offers the user a number of options on its main menu. The first, Learning the Keyboard, is the main typing course, which comprises eight lessons covering the major areas of the keyboard, starting with the home keys and progressing to the number keys (not the numeric pad yet, though).

Each lesson is paced appropriately for the learner, based on his or her goal speed and, as mentioned above, includes appropriate exercises on troublesome keys. The lesson begins with some revision and review of progress to date, providing some valuable warming up exercises before the new material is displayed. The student is given the opportunity of revising an earlier lesson. ▷

A common problem facing many executives is having to learn to type. Confronted with a PC on their desk for the first time, they are unable to derive the full benefit of the machine because they aren't keyboard literate. A program called Typequick offers an imaginative fix for this predicament.

Made by:	Typequick
Hardware required:	Most popular computers
Price:	$77 for single-user licence. Typical multi-user licence for eight machines with 80 copies is $500. Extra copies $5 each and extra machines $60 each.
Distributor:	Typequick, 14 Cecil Street, Gordon 2072; (02) 498 7428

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The **microbee** is indeed Australia's own Educational Personal Computer, designed for the classroom and home, with high quality graphics, sound effect capabilities, built-in software including Wordbee — the wordprocessor, MicroWorld BASIC — the **microbee's** own language, and Telcom — the communications package, with a real time clock and alarm features.

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A BEE FOR ALL REASONS

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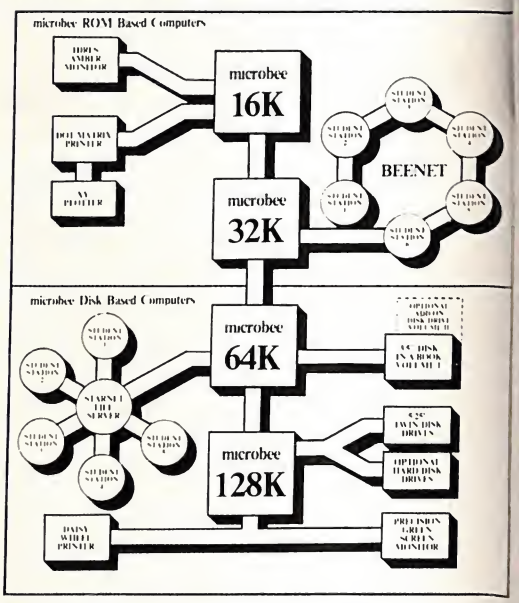
It is no coincidence that **microbee's** educational software is entitled "Learning Can Bee Fun". The **microbee** has *proved* that learning can be fun, and by doing so, has gained the endorsement of the Australian Schools Commission, the majority of Depts. of Education throughout Australia and the Education Department in Israel. More recently the Swedish Schools Dept. have chosen **microbee** after months of stringent tests and stiff opposition from the big American, British and Swedish manufacturers.

microbee 16K Educator . . . $449



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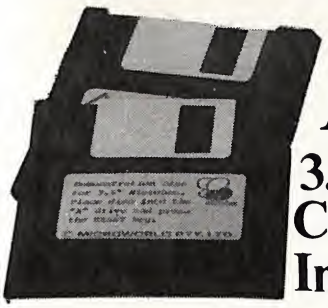

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VOLUME 2 is an add-on disk drive in a matching volume

VOLUME 2 **$345** incl. sales tax.

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Because microbee is the ideal Hackers micro

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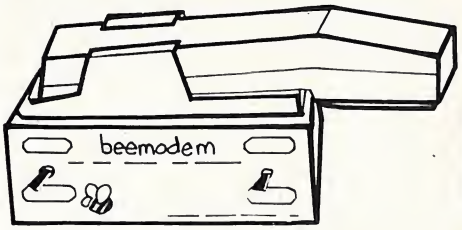

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128K Small Business Computer

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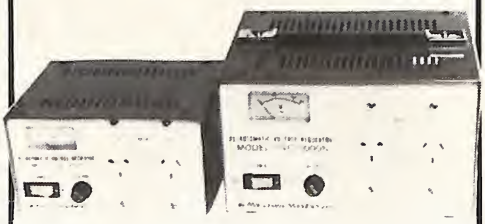

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Each lesson tackles a different area of the keyboard, starting with the left hand home keys (asdfg) and introducing new areas gradually. At first the lesson involves only the new area, but gradually other keys are introduced, and by the last lesson the student should be able to range over the keyboard with ease.

Another option on the main menu is Keyboard Speed and Accuracy, which covers the keyboard generally. To improve speed, the program will put words on the screen somewhat faster than the student's average speed to date. The goal is to keep up, without worrying about accuracy. The next lesson is similar, except that now mistakes must be corrected. This is intended to consolidate the speed gain while improving accuracy. The program will repeat these two lessons: speed practice continues until you have improved by 10 per cent, and then accuracy practice continues until you achieve 97 per cent accuracy.

Keeping Track

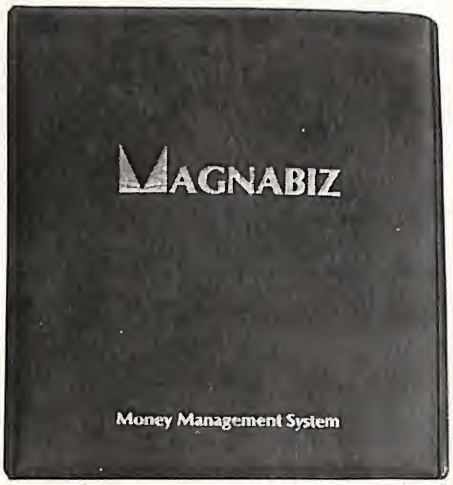
Another pair of options on the main menu allow viewing or printing of results to date, so students can monitor their own progress. This is in addition to the standard feedback received at the end of each lesson.

A similar set of options provides a training course on the numeric keypad alone, with similar features. This is most suitable for training data entry operators. The Typequick program is much more advanced than similar programs which have been written overseas, and it has considerable export potential. This is borne out by the recent agreement between Typequick's developers and IBM, under which the computer company will market Typequick as a vendor logo product; which means it will be under the Typequick logo rather than the IBM label.

Versions of Typequick are available for virtually all personal computers using CP/M, MS-DOS, PC DOS and Apple DOS operating systems.

Typequick fulfils a fairly simple purpose – there's nothing terribly complicated about displaying typing exercises. However, the combination of some applied psychology with some quite tricky timing and testing software has produced a product that is obviously in a class well above its competitors. For this reason, we have decided to award Typequick the Special Commendation for an Australian Software Product. □

MAGNABIZ



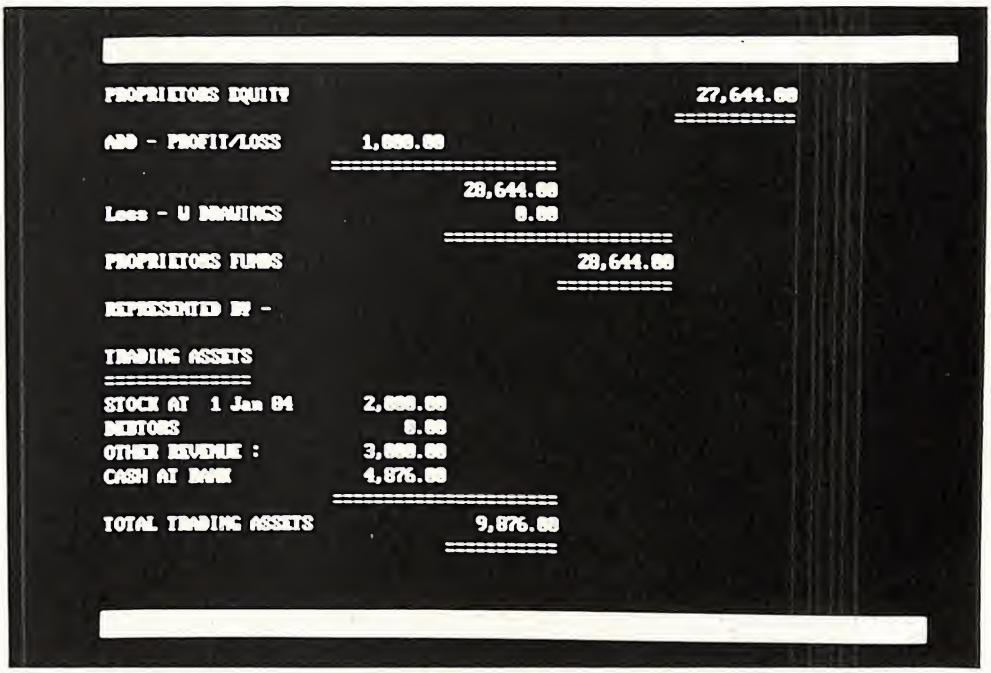
There has been a gap in the accounting software market between simple cashbook programs and complex, full-blown accounting systems; there's been nothing for the person operating a small business who just wants to keep the books up to date and in order without getting into complicated calculations. Magnabiz fills this gap very creditably.

One of the most interesting Australian packages to appear in the last year is Magnabiz, a simple accounting system for small businesses that aims to fill this gap in the marketplace between the simple cash-

book programs which provide only minimal management information and the full-blown accounting systems such as Attache, IAL, IMS and Sybiz. These larger packages provide full invoicing, debtors, creditors, general ledger, inventory, payroll and other facilities – often too much for a small business, particularly at a price tag typically in excess of $3000.

Another problem which confronts small business operators is that while they may have a basic understanding of accounting principles they are not trained in bookkeeping and are easily intimidated by accounting jargon.

Magnabiz is designed to provide complete record keeping and reporting facilities for small to medium-sized trading ventures. While it is based on solid accounting principles – as every such program has to be – it avoids technical jargon and instead proffers good advice on such topics as numbering cheque books and generally preparing all your paperwork for data entry when first setting up the system.



Logical Flow

The system automatically starts up after the system boots, and the user is shown the current system date and offered the opportunity to change it. The main menu is then displayed and the user can proceed to work.

The system is completely menu driven and prompts at all stages of operation. Occasionally, when first using the system, the user may not be clear exactly what is required, since the prompts tend to be terse, but after a few days of use there should be no more problems.

Generally, the first thing to be done in any session is to add entries to the transaction file (choice A on the main menu). The system prompts the user to specify whether this is a credit note, cheque, deposit or invoice (N/C/D/I). Obviously, in most cases it makes a major difference whether the document was sent or received, and this is the next question the system asks. It then prompts for the date, description code (D for deposit, for example), the amount and the deposit number (which must begin with A, as on the deposit book cover).

Contrast this with the operation of full-scale accounting systems, which require endless menu selections to get to the entry of the appropriate transaction type and then prompt for a lot of irrelevant detail (from the small business viewpoint – with one sales person, for example, all kinds of sales dissections are useless).

In the case of cheques, the system asks for the name of the creditor (actually, avoiding jargon, it asks who the cheque was payable to), and then asks for a classification. This is the account to which this cheque will be allocated – purchases, adverts, insurance, vehicle, fixtures/fittings, and so on. Once the cheque number has been entered, the system will offer to automatically generate a received invoice entry, to take account of cash dealings where the supplier does not send an invoice. This keeps the system in balance. Of course, if the transaction was on credit and the supplier does send an invoice, it is entered in the usual way, and the system is again kept in balance.

Invoices (sent or received) are entered in a similar way, as are credit notes.

Entries can be edited or deleted, and the system will warn the user to make carry forward entries for any deleted records. For example, if one wants to delete old entries to make space, then the balances for all suppliers or debtors must be carried forward, otherwise the block deletion will throw the entire system out. Again, transactions can be deleted by amount or by document number.

Reports

A number of reports are available in the system, ranging from simple listings through to a comprehensive report which is virtually a balance sheet. The reports are suited firstly to allowing day-to-day, hands-on management and secondly to the provision of adequate records to permit the preparation of company returns.

Reports are generated quickly, making it possible to produce reports on the screen just to locate one particular transaction.

The manual is quite clear and specifically avoids accounting jargon. While a basic knowledge of accounting procedures might help the user, it should be possible to follow, even for a complete novice.

The panel was impressed by the straightforward approach of this software package. It is pragmatic, easy to use, very useful and its design is well matched to its target market. □

Made by:	Magnasoft Pty Ltd
Hardware required:	IBM PC or similar compatible.
Price:	$775
Distributor:	Magnasoft, 9 Perry Street, Matraville 2036; (02) 666 4101.

HI-TECH C COMPILER

The C programming language is gaining in popularity at an amazing rate; it gains hundreds of new devotees daily. There are dozens of C compilers on the market for a variety of processors and operating systems, virtually all of them from the US, which is why the appearance of Hi-Tech C Compiler is so significant. It's written by an Australian and supported from Australia, and that can make all the difference when you're trying to figure out just why your code won't run.

Virtually all the C compilers on the market support slightly non-standard versions of the language, so for programmers working in a language as sophisticated and powerful as C, support is very important. Information like how the compiler manages memory can be significant for some applications, yet getting that kind of information from a software house eight thousand miles away is not easy. Nor is there the same opportunity to ask questions when the supplier is so far away.

Add to the Australian origin of Hi-Tech's C Compiler the fact that it is a good one, and you can see why it should be a popular product.

Several versions of the compiler are available, for Z80 and 8086/88 processors under CP/M, CP/M-86 and MS-DOS. The compiler is fully compatible with Unix V7 C, with some extensions of its own. For example, this compiler supports enumerated types, which are not commonly supported in commercial C compilers, and structure operations. It also supports type casting, another feature that many compilers omit.

The compiler comes with source code for its libraries, which means users have a better chance of working out what is going on when their program fails to perform as expected. Further, no royalties are payable on distributed code.

This compiler is unusual in featuring stronger type checking than most, rather after the fashion of Pascal or the C syntax checker, Lint. It is also better than most compilers (especially Pascal compilers) at recovering from errors and continuing to discover further errors.

The compiler manager is also quite smart – a single command will invoke multiple compiles or assemblies as required, then invoke the linker to produce the executable code. This makes the system easier to operate and more productive.

Included as part of the package is a macro assembler for those rare occasions when C can't get close enough to the machine. It's also possible to have the compiler output assembly language, which can then be optimised by hand.

C How It Runs? Fast ...

In fact, the compiler does include an optimisation pass which can be set up for either speed or space optimisation, and the assembler even includes an optimiser for jump instructions. The resulting code is very fast indeed; benchmarks show it to be faster than its competitors.

Even at link time, the package demonstrates considerable speed, through the use of a proprietary object format and random-access library files. Names can be unlimited in length, and program segments can be specified to load at absolute address and in any order, making the package suitable for the production of ROMmable code.

For those whose interest lies in floating point manipulation, the compiler comes with libraries for both conventional floating point subroutines and for 8087 support.

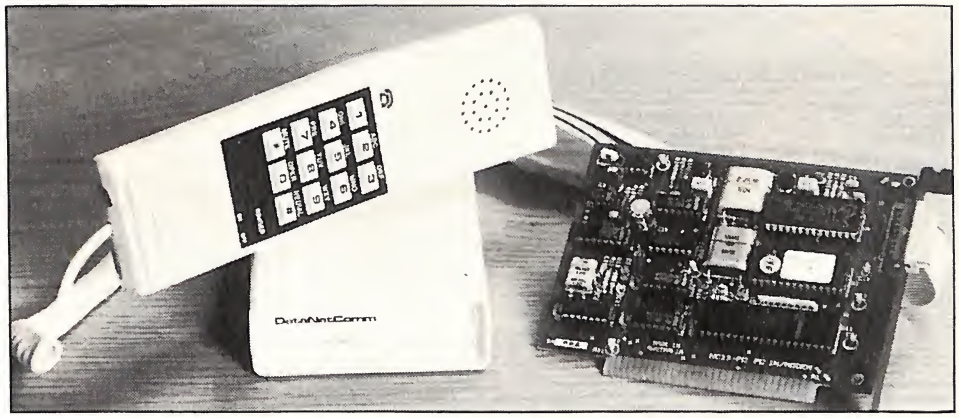
The documentation for the compiler is terse but complete, designed as a complement to the Unix C Language Reference Manual, and very well organised. As far as possible, operation of the compiler and its utilities are compatible with the Unix versions, and the various options are always consistent.

The overall impression one receives is that this is a solid, production-quality compiler, suitable for commercial use. Commercial programmers worry more about the ability of the compiler to produce good, bug-free code rather than possible performance of the code, and will not use packages in which they cannot place complete trust. It looks as though this package will meet these criteria, and more, easily. □

Made by:	Hi-Tech Software
Hardware Required:	Z-80 with 56 Kbytes RAM, 8088- or 8086-based machine with 128 Kbytes RAM.
Price:	Z-80 version $250, 8086 and 8088 version $300.
Distributor:	Hi-Tech Software, PO Box 103, Alderley 4051; (07) 383 852.

COMMENDATION

DataNetComm's IN/MODEM



For years there has been no CCITT version of a modem that meets Australian requirements and regulations, which meant users here were unable to take advantage of many of the extra capabilities of US modems. DataNetComm's In/Modem looks like filling this gap.

The name of the game today is communications. As personal computers have grown in ability to handle large amounts of data, so it becomes less and less practical for users to create large databases by typing them in through the keyboard. Today we use personal computers to analyse data collected elsewhere, as part of the normal accounting procedures, for example, or prepared by information services such as Reuters.

To access external databases – that is, other computers that are not in the same building – one uses either a leased, permanent telephone line or a conventional phone line through the public switched telephone network (PSTN). But the PSTN is designed to carry voice signals, not data, so some some kind of gadget is required to convert digital signals into sound it can cope with.

This gadget is called a modem (modulator/demodulator). Modems have been around for some time but now, with increased use of personal computers in business and deregulation on the part of Telecom, a new breed is emerging which makes life even easier. For some years we have looked with envy at the capabilities which have been available to PC users in the US, such as autodiallers and modems which will automatically answer incoming calls.

Although these capabilities have been theoretically available to local users for some time, in practice they have been restricted. Most communications software, of course, comes from the US and is written to drive US modems, and in particular the DC Hayes Smartmodem, which has led the industry for some years now. Unfortunately, that modem has not been available in a CCITT version which would meet Australian requirements, and Australian modems have used control codes which were incompatible with US-written software.

At last, we have the DataNetComm PC In/Modem. This modem solves our problems, in that while it meets the CCITT standards in use in Australia, it emulates the Hayes Smartmodem. At last, we can get full use out of the communications modules provided in programs like Framework and Symphony, not to mention specialised communications programs like MITE, Crosstalk, the MODEM family and YAM.

A Single-chip Microcomputer

The In/Modem actually consists of three units. Firstly, there's a circuit card which will fit inside an IBM PC or similar machine. This carries most of the modem circuitry, in particular the World modem chip and the single chip microcomputer which provides the unit's 'smarts'.

This card connects via a cable to a speaker box, which allows monitoring of the progress of a call while it is being placed, and another cable leads to a handset which can be used to make ordinary calls. The whole unit is, of course, Telecom approved, and simply plugs in in place of a conventional telephone.

The In/Modem boasts a number of useful features. First of all, the Hayes Smartmodem compatibility makes it much easier to use and takes advantage of such software features as telephone number look-up and autodialling, automatic log-on and so on.

Next, the modem meets both Australian and US standards, allowing the user to dial directly into US modems such as bulletin boards which are not connected to packet switching networks. In addition, it is capable of operating at 1200 baud receive and 75 baud transmit, as required for connection to videotex services such as Viatel and Cybertel. Optional software will provide videotex support on the PC (although the PC hardware cannot display the eight colours which are possible on a videotex screen).

The modem supports both pulse and tone dialling – while most exchanges still use pulse dialling, many PABXs use tone dialling, which is faster in operation.

The board includes its own asynchronous port, which is configurable as COM1: or COM2: as far as PC software is concerned. This is particularly significant for videotex operation, as standard asynchronous ports cannot operate at different speeds on transmit and receive, making it impossible for most external modems to operate with videotex services.

The In/Modem is extremely simple to install and use. In most cases, because of the intelligence of the modem, operation is completely automatic with even less intervention required than would be the case with a dumb modem. It is particularly nice to be able to use the advanced features of software from the US. We foresee a very successful future for this product □

THE LABTAM 3003

The latest product of Labtam's move into the computer field is the 3000 series, which contains machines both larger and more powerful than the average PC. We examined the 3003, which is basically a single-user machine but can be expanded to multi-user operation.

Labtam got its start over ten years ago manufacturing laboratory measuring equipment, but it soon became obvious that data acquisition and analysis was just as important a function as the measurement itself. The company therefore moved into the computer field and has now achieved considerable success with its machines.

The 3003 is based on an 8086 processor, running at 8 MHz, with a 5 MHz Z80A sitting on the sidelines to run 8-bit programs. Up to 640 Kbytes of memory can be installed in the system, and the Z80A can access any 64 Kbytes of this as 32 2 Kbyte pages – a very versatile memory management system indeed.

Physically, the 3003 looks rather like a Mexican pyramid – an unusual design, but one that I could live with. Above the pyramid there's a 13 cm disk drive and a 10 Mbyte hard disk. A colour display sits above the unit, and a large keyboard sits in front

Turning the machine around to look at the back, one is confronted by a staggering array of connectors. There are five RS232C ports, necessary for multi-user expansion as well as connection to a modem and other peripherals. Two parallel ports – one for output, one for input – allow connection to a Centronics-style printer interface or D/A converters and other equipment, and finally, there are three more interfaces for network, joystick and lightpen I/O.

Internally, the machine is based on the Intel Multibus, a fairly large card format that puts a lot of electronics on each card. The keyboard has 101 keys, including 14 on the numeric pad, 15 on the cursor/editing pad, 14 function keys and the remainder in the standard qwerty layout. It's big, but very usable. The display is a colour monitor with 800 by 200 resolution, and the system implements a version of the DEC REGIS graphics drivers which are familiar to scientific and technical users.

The system software can be one of several configurations. One thing that is atypical about this machine and reflects its scientific background is that whatever operating system you choose runs as a subtask under a real-time kernel which manages the interrupt structure of the machine. Presumably each operating system just calls on this kernel for services such as I/O. It also means that the machine can be doing real-time data acquisition or some other activity at the same time as running CP/M-86.

Operating systems available are CP/M-86 and MP/M-86 – both with support for a single 8-bit task – and MS-DOS. Concurrent CP/M should be implemented shortly, perhaps by the time you read this.

In summary, the 3003 is a well-engineered, high-performance unit which will serve well in business or scientific roles. The panel sees it as being less innovative than some other machines examined, but we know Labtam is working on a 32032-based UNIX machine which will easily even the score . . . □

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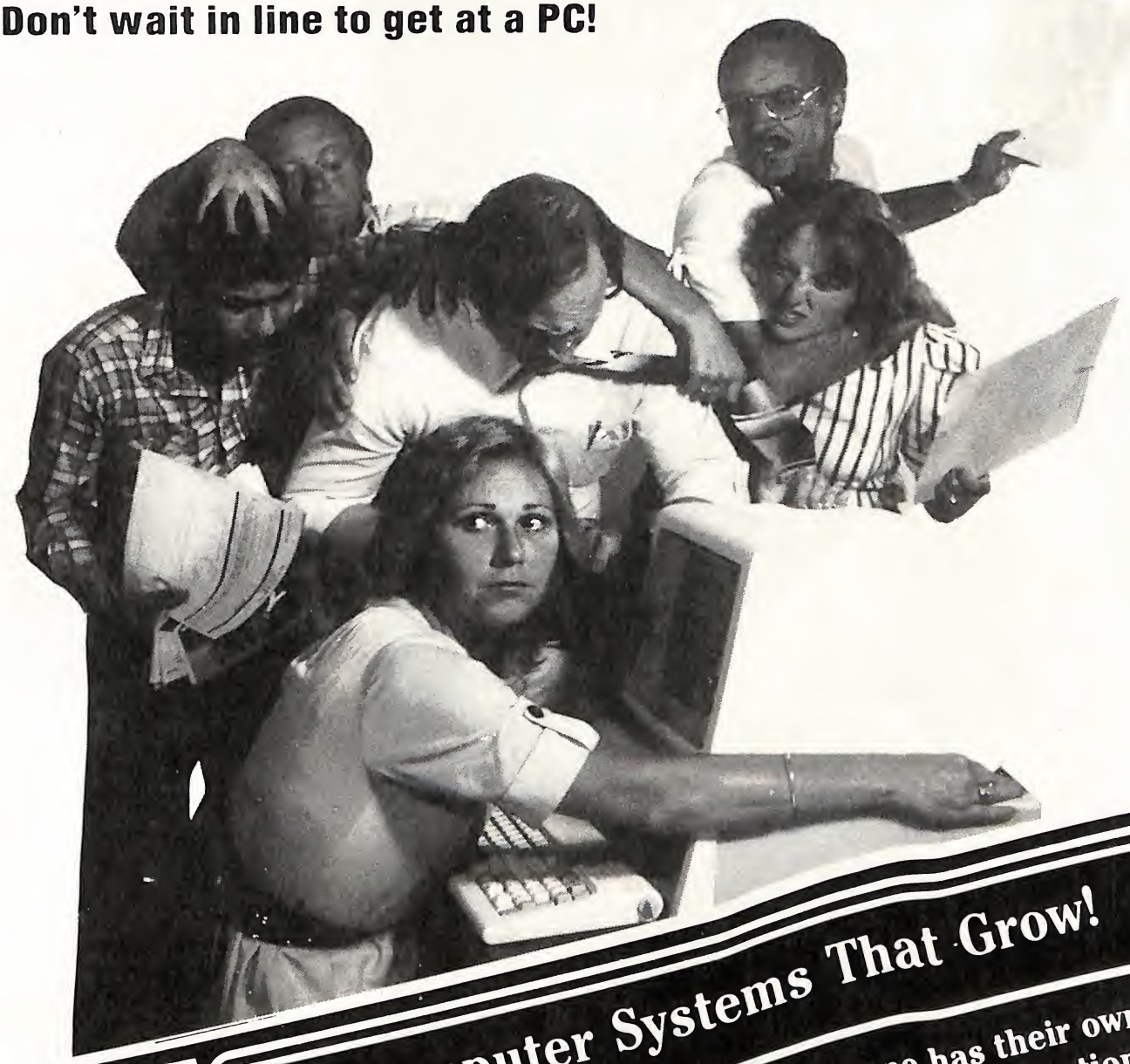

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PORTAPAK

First of all, there's the size of the box. At just 355 by 175 by 275 mm, it's close to being the smallest machine in its class. Despite that, it's no lightweight; brace yourself before picking it up! To get around the weight problem, The Portable Computer Co supplies a blue canvas bag for the unit, which allows the user to take the strain on the shoulders. To be fair, the weight is due to the rugged construction of the unit, which will obviously stand a pounding.

Although it is compact, the Portapak has a good-sized nine inch (23 cm) green phosphor screen. Unusually for a machine in this class, the display is 80 columns by 35 lines, which is excellent for word processing and spreadsheet applications (if you can get software to work in this format). The screen also has excellent resolution in graphics mode, at 640 by 304.

The system is again unusual in loading its character set from disk, rather than having it in ROM. This means the user can design his or her own character sets using the CHRED utility supplied; two character sets come as standard with the machine. Another useful facility of the screen is the ability to emulate any other terminal, which is particularly useful when logging on to remote hosts.

Beside the comparatively large screen there are two 13 cm disk drives, each of 800 Kbytes capacity. This is well in excess of most portables' capability. In order to allow users easy access to software, the machine can also read and write Osborne and Kaypro formats.

To the right of the disk drives is a set of connectors. The machine is amply provided with I/O, including a full RS232C port, serial printer port, parallel Centronics printer port and an I/O expansion connector allowing the addition of other devices. There's also an external video connector.

Internally, the Portapak boasts some sophisticated hardware capabilities. The processor is a 6 MHz Z80B, which means its performance is somewhat higher than the average eight-bitter and many 16-bitters. Memory capacity is higher, too, at 128 Kbytes, and the machine is able to make good use of this with the optional CP/M Plus operating system.

Software

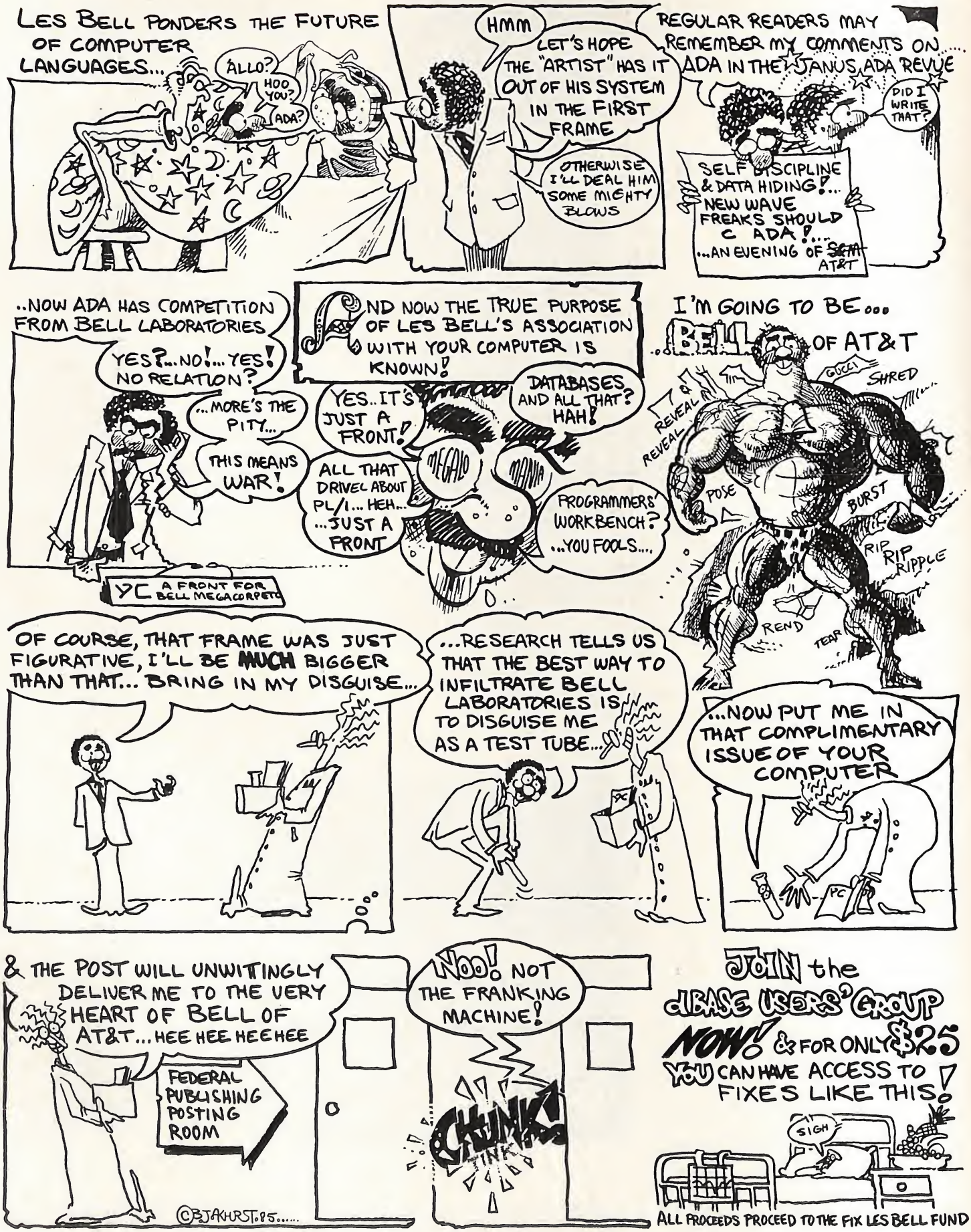
The operating system supplied as standard is CP/M 2.2, which is tried and true and features a good range of applications software which will run excellently on the Portapak. Standard applications software includes the Spellbinder word processing and office management package, which combines text editing capabilities with forms management, maths capabilities and a macro command language. Also supplied is a menu system which enables non-technical users to bypass the CP/M command line, a memory-based printer spooler, a terminal configurator, and the public domain EBASIC compiler for BASIC programming. The system also comes with some other handy public domain utilities to get the new user off to a good start.

Another part of the standard software package is a modem communications package. In fact, our evaluation machine was fitted with a pre-release built-in 300 baud modem, with full auto-answer and autodial facilities. Using a supplied headset/microphone combination which plugs into the front panel of the computer, it even functions as a smart telephone!

Options for the machine – some admittedly still under development – include a network, based on Corvus hardware and CP/Net, 5 Mbyte and 10 Mbyte hard disks, speech synthesiser and other goodies.

The Portapak is a very nicely built machine indeed. It is rugged, yet sophisticated, with the power to run some very advanced software and with some very interesting expansion capabilities. It will be equally at home as an advanced hacker's machine or as a small business/accounting machine. □

While Australia has a number of local manufacturers, most of these are making desktop or larger units. Only one manufacturer is making a portable: The Portable Computer Co Pty Ltd. Its Portapak computer offers high performance in a remarkably compact package.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ALLO?
HOO YOU?
ADA?
HMM
LET'S HOPE THE "ARTIST" HAS IT OUT OF HIS SYSTEM IN THE FIRST FRAME
OTHERWISE I'LL DEAL HIM SOME MIGHTY BLOWS
REGULAR READERS MAY REMEMBER MY COMMENTS ON ADA IN THE JANUS ADA REVUE
DID I WRITE THAT?
SELF DISCIPLINE & DATA HIDING!... NEW WAVE FREAKS SHOULD C ADA!... ...AN EVENING OF ~~SCAT~~ AT&T
..NOW ADA HAS COMPETITION FROM BELL LABORATORIES
YES?..NO!...YES! NO RELATION?
...MORE'S THE PITY...
THIS MEANS WAR!
AND NOW THE TRUE PURPOSE OF LES BELL'S ASSOCIATION WITH YOUR COMPUTER IS KNOWN!
YES..IT'S JUST A FRONT!
DATABASES AND ALL THAT? HAH!
ALL THAT DRIVEL ABOUT PL/1... HEH... ...JUST A FRONT
MEGALO MANIA
PROGRAMMERS' WORKBENCH? ...YOU FOOLS....
YC A FRONT FOR BELL MEGACORP!!!
I'M GOING TO BE... BELL OF AT&T
GUCCI
SHRED
REVEAL
REVEAL
POSE
BURST
RIP
RIP
RIPPLE
REND
TEAR
OF COURSE, THAT FRAME WAS JUST FIGURATIVE, I'LL BE MUCH BIGGER THAN THAT... BRING IN MY DISGUISE...
...RESEARCH TELLS US THAT THE BEST WAY TO INFILTRATE BELL LABORATORIES IS TO DISGUISE ME AS A TEST TUBE...
PC
...NOW PUT ME IN THAT COMPLIMENTARY ISSUE OF YOUR COMPUTER
PC
& THE POST WILL UNWITTINGLY DELIVER ME TO THE VERY HEART OF BELL OF AT&T... HEE HEE HEE HEE
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PROGRAMMER'S WORKBENCH

Les Bell ponders on the future of computer languages, introduces a successor to C, and offers a solution to the problem of misplaced records (and assorted other niggles) in dBase II.

Competition for Ada

REGULAR READERS will remember my comments on Ada in the review of Janus Ada (*Your Computer*, February 1985), and some of the reasons why Ada was developed. Basically, Ada was designed to implement some of the latest ideas in software engineering, in particular abstraction (the idea that you should concentrate on the logic of the problem, not the problem of the language), separate compilation and data hiding.

All these ideas are very powerful, and the more I think about them, and the more opportunities I have to try them out in my own programs, the more convinced I become Ada represents the wave of the future. Of course, other languages can embody the same principles, so there's no guarantee Ada is the wave itself. In particular, Ada has some new competition from – you guessed it – Bell Laboratories (no relation, more's the pity).

We are all familiar with the C language, a sparse yet expressive language which symbiotically grew along with the Unix operating system. C has been pretty good to a lot of people; it does all they want and more, and they can't see the value of Ada. Perhaps they have the self-discipline and skill to do in C what Ada would force them to.

But at Bell Labs time never stands still, and in an organisation where 'publish or perish' is the maxim, it was around time C was upgraded. The new language is not called D, which lays that joke to rest; instead it's called C++, which is not a bad pun in itself. It's called incremental C, for those who don't speak C fluently.

So far, it's available to educational licensees only, which might mean it's at the beta test stage or that AT&T is trying to create a world of C++ programmers before releasing it to commercial users. Take your pick, according to your degree of cynicism.

C++ is a superset of C which offers data abstraction and enhanced type checking The data abstraction facilities are based on a class concept with data hiding, single inheritance, and both static and virtual member functions. This gives C++ features similar to those of Smalltalk, Clascal (the Lisa language) and Ada.

A particularly important facility in modern languages is operator overloading. For example, in a graphics application, you might define a data type called 'colour', which might be a structure containing hue and luminance values. You might further want your application to allow the mixing of colours from paint pots, by using the additive mixing of colours. So, for example,

```
purple = red + blue;
```

would define a new colour – except the plus operator is defined for numeric addition, not addition of colours. However, in C++ you can define your own addition operator, or any other operator, for whatever data types you use. As long as plus has been defined for the colour type, the statement above is perfectly valid.

C++ also allows overloading of function names. Other facilities include optional guaranteed initialisation of data structures, optional user-defined implicit type conversion, in-line functions, constants and user-controlled memory management.

So far, C++ has been installed in a number of sites inside AT&T, and has been used in the implementation of debuggers, compilers and applications programs. It is link compatible, and with minor exceptions, source compatible with the C language.

Guess we'll just have to wait now.

dBASE Structure Editor

A common problem with dBase databases is corruption of the database in various ways. Every now and again, for example, some of your records will disappear.

This is caused by dBase not maintaining the file correctly. The first 520 bytes of a dBase database is an area called the structure, which defines the structure of the database. It's laid out in a particular format, and contains vital information like the number of records in the database, the date of last update, the record length and the names, lengths and types of the fields in each database record.

Updating the record count occasionally has to be done by hand. You can tell if you have this problem quite easily. You know, for example, that there should be over three thousand records in a particular database, yet some of them seem to be missing. If you use the DISPLAY STRUCTURE command and the record count given there is obviously wrong, then that's the source of the problem.

There are a number of things you can try to fix this. First of all, just try USEing the database, and issuing an APPEND command. If the record number at the top of the screen looks okay, append a record and exit. That may well have fixed it, but if it hasn't, then try this.

USE the corrupted database, then COPY TO some other file. This might work because in versions prior to 2.41, the COPY keeps its own record count and ignores that in the database structure. However, if it fails, you'll have to go in and edit the structure record count by hand. You can do it with a disk patcher like the Norton utilities or DU from the CP/M Users' Group, but there are more elegant ways of doing it.

Another problem with dBase is the long and complex way you have to go about ▷

changing the names of database fields. You have to COPY the database either SDF or delimited, then MODIFY STRUCTURE and APPEND SDF or DELIMITED. With a big file, you may not even have space to copy the file like this.

I decided to write a single program, primarily to fix the record count problem, but also taking the opportunity to allow field renaming. The resulting program, called SE (Structure Editor), is pretty well bullet-proof, and is written in such a way that it will work on any terminal.

From the listing, you can see it's written in PL/I. Of course, many of you will not have a PL/I compiler, so I've arranged for distribution of the program to members of the dBase Users' Group on dBUG Public Domain Vol 1. If you're not a member of the dBase Users' Group, I suggest joining so you can get access to fixes like this. Annual membership is $25, and you can get details from dBase Users' Group, PO Box 297, Neutral Bay Junction, 2089.

Structure Editor. A fix for the record count problem.

```
se:                         /* Structure Editor */
    proc options (main);

/*
    PL/I-80 program which reads structure of a .DBF file and then
    allows user to update record count or field names.

    Revision 1.0 by Les Bell 1/6/85
*/

/* dBASE II structure of the structure */

dcl 1 structure,
        2 dummy1 char (1),          /* Always 02H */
        2 no_of_recs fixed binary (15),
        2 date,
            3 month fixed binary (7),
            3 day fixed binary (7),
            3 year fixed binary (7),
        2 rec_size fixed binary (15),
        2 field_desc (32),
            3 name char (10),
            3 dummy2 char (1),
            3 type char (1),
            3 size fixed binary (7),
            3 intuse fixed binary (15),
            3 no_of_decs fixed binary (7),
        2 terminator char (1);

    dcl i fixed binary (7);
    dcl pos fixed binary (7);
    dcl database file;
    dcl nullname char (10) static init ('^@^@^@^@^@^@^@^@^@^@');
    dcl names (32) char (10);
    dcl choice char (1);
    dcl datafile char (8) varying;
    dcl upper char (27) static init ('ABCDEFGHIJKLMNOPQRSTUVWXYZ:');
    dcl lower char (27) static init ('abcdefghijklmnopqrstuvwxyz_');
    dcl recno fixed binary (15);
    dcl max_fields fixed binary (7);
    dcl control fixed binary (7);

    /* mainline code */
    recno = 0;
    call heading;
    put skip(3) list ('Name of database file to work on:');
    get list (datafile);

    close file (database);
    open file (database) record keyed direct update title (datafile||'.DBF');
```

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Structure Editor continued.

```
        read file (database) into (structure) key (recno);

        control = 0;
        do while (control ^= '5');
            put edit ('1 - Open new database',
                '2 - Display Structure Information',
                '3 - Alter Record Count',
                '4 - Change Field Names',
                '5 - Quit',
                'Please select: ')(5(skip,x(20),a),skip(2),a);
            get list (control);
            goto q(control);
            q(1):
                call open;
                goto q(5);
            q(2):
                call info;
                goto q(5);
            q(3):
                call setrec;
                goto q(5);
            q(4):
                call info;
                call edit;
    q(5):
        end;

        /* Nested procedures */
        heading:
            proc;

            put list ('-------------------------------------------');
            put list ('dBASE II Structure Editor          Version 1.0');
            put list ('Copyright 1985 Les Bell and Associates Pty Ltd');
            put list ('-------------------------------------------');
        end heading;

        open:
            proc;

            close file (database);

            put skip(3) list ('Name of database file to work on:');
            get list (datafile);

            open file (database) record keyed direct update title (datafile||'.DBF');
            read file (database) into (structure) key (recno);
        end open;

        info:
            proc;
            put skip edit ('No of records :',structure.no_of_recs)(a(16),f(8));
            put skip edit ('Date of update:',
                           month,'/',day,'/',year)
                           (a(16),f(2),a(1),f(2),a(1),f(2));
            put skip edit ('Record size   :',rec_size)(a(16),f(8));
            put skip edit ('Field number',
                'Field name',
                'Type',
                'Size',
                'Decs')
                (a(12),x(2),a(10),x(2),a(4),2(x(2),a(4)));
            do i = 1 to 32 while (field_desc(i+1).name ^= nullname);
```

▷

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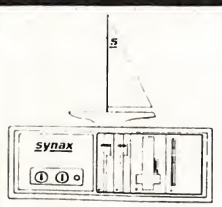
Structure Editor continued.

```
                pos = index(field_desc(i).name,ascii(0));
                names(i) = substr(field_desc(i).name,1,pos-1);
                field_desc(i).name = substr(field_desc(i).name,1,pos-1);
                put skip edit (i,
                    names(i),
                    field_desc(i).type,
                    field_desc(i).size,
                    field_desc(i).no_of_decs)
                    (f(12),x(2),a(10),x(2),a(4),2(x(2),f(4)));
            end;
            max_fields = i - 1;

        end info;

        setrec:
            proc;

            dcl input fixed binary (15);

            put skip list ('Current Record Count = ',no_of_recs);
            put skip list ('Enter New Value (or 0): ');
            get list (input);
            if input = 0 then put skip list ('Record count not updated');
            else do;
                no_of_recs = input;
                write file (database) from (structure) keyfrom (recno);
            end;

        end setrec;
```


Multi-user Business Systems



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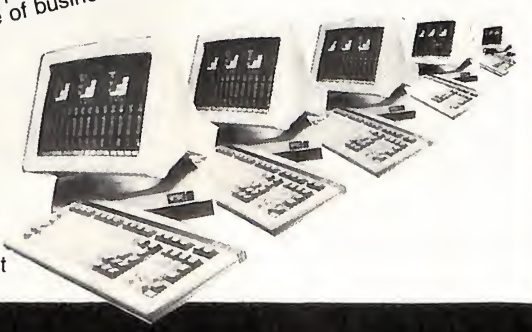

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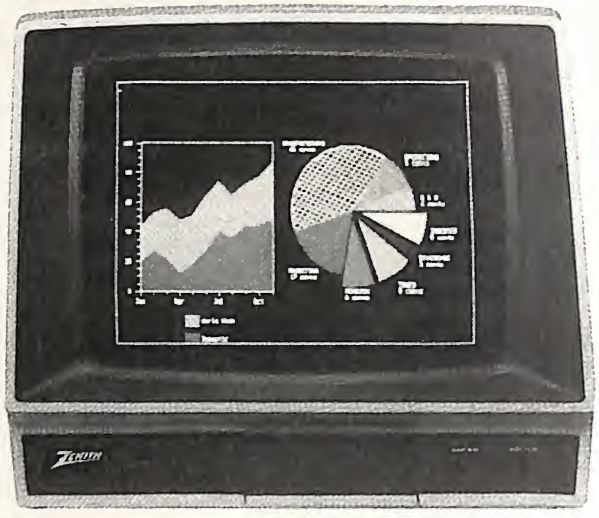

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WF950-81

Structure Editor completed.

```
edit:
    proc;

    dcl (control,i) fixed binary (7);
    dcl (newname,temp) char (10);

    put skip list ('Enter number of field to rename, or 0 to quit:');
    get list (control);
    do while (control ^= 0);
        if control > max_fields then put skip list ('No corresponding field^G!');
        else do;
            temp = nullname;
            put skip list ('Current name: ',field_desc(control).name);
                put skip list ('New name    : ');
                get list (newname);
                newname = translate(newname,upper,lower);
                do i = 1 to length(newname);
                    substr(temp,i,1) = substr(newname,i,1);
                end;
                field_desc(control).name = temp;
            end;
            put skip list ('Enter number of field to rename, or 0 to quit:');
            get list (control);
        end;
        write file (database) from (structure) keyfrom (recno);

    end edit;

end se;
```


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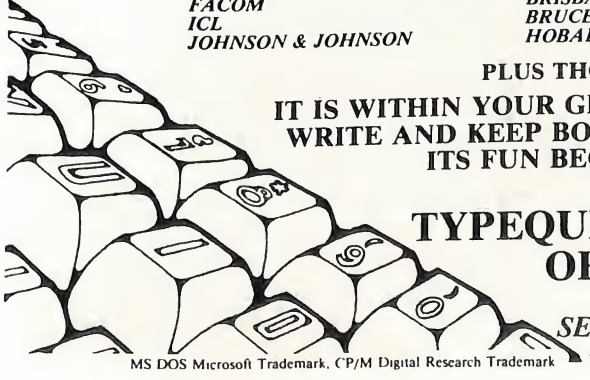

MS DOS Microsoft Trademark, CP/M Digital Research Trademark

To some of us in business it seems that computers often ask more questions than they answer. In fact having made a decision to purchase a machine the real crunch comes when you start trying to use the software. It's like another language. And the manual sometimes leaves a little to be desired.

Help!

Is available from Busiware, a division of the Australian "Ozi Soft" company. They have a range of software to suit different size companies and with a very important feature . . . "help" information imbedded in each program. By simply pressing the "H" button for help, and the program number, you'll get the explanation that up till now has been lip numbing.

Clever Software

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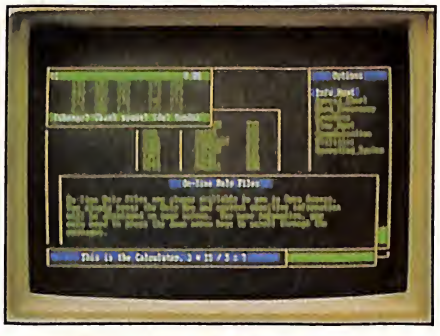
WORKS 449

Reviews



Wordcraft ____ **90**

Our word processing expert is watching his control-Ps and Qs as he tries to read between the lines of the latest offering from England.

By John Nicholls

President 16-201 ____ **94**

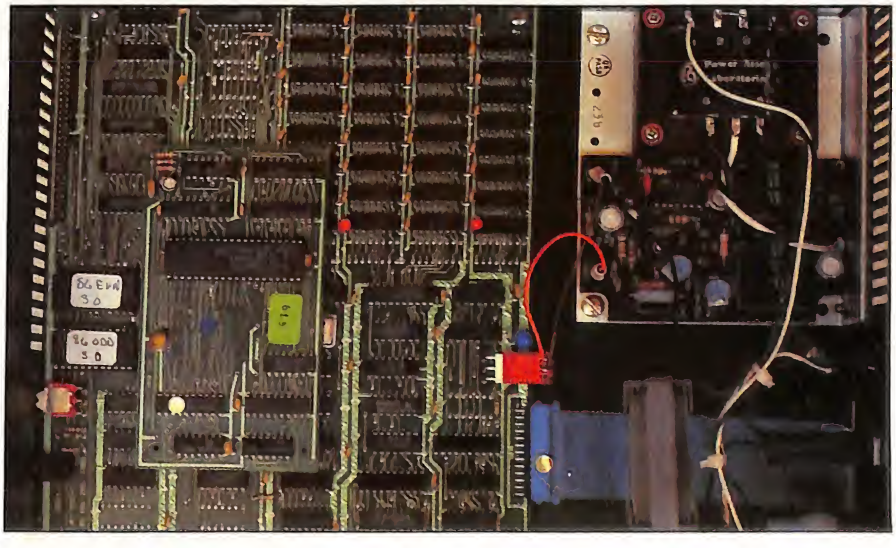
Who said the only adventures you can have with computers are the on-screen type? For this evaluation, Frank Lee tucked the new President into his saddle bags and headed West.

By Frank Lee

Bit Bucket ____ **100**

Leonardo must be twitching in his grave, but the da Vinci graphics packages for the Mac are great fun . . . oh, and useful, too. This month's BB also investigates a new disk copier for Apple software, a co-processor for Z80 machines and the AppleMouse II.

By Evan McHugh and Darren Challis



WORDCRAFT

Wordcraft is a fully-functioned word processor posing direct competition to WordStar and the like. It comes from England, so we thought it would be interesting to see how it differs from the far more common American programs. John Nicholls, our word processing expert, investigated its capabilities.

THE ANSWER to the above question is that Wordcraft doesn't differ much from the American word processors at all. Like all word processors (and their operators) it has its quirks and peculiarities. Its range of commands, for example, is vast, so learning to use all of them is no easy task.

Wordcraft comes in an attractive slip-case, which houses the two- diskette package and four manuals: the *Installation Guide*, *Operator's Reference Guide*, *Self-Instruction Work Cards*, and *Supplement for Version 2*. You are supposed to read the supplement first, but this is not immediately apparent. The supplement contains the registration procedure and details of a number of features added after the other manuals were prepared. Also included in the package are a rudimentary key template and a daunting Operator's Reference Card listing the more than 150 commands. The *Installation Guide* explains how to set up a sub- directory on the IBM XT, but doesn't explain how to make the program self-loading. This is a strange omission.

For such a comprehensive program the *Reference Guide* is unusually compact, consisting of only 89 pages plus an index. With the exception of the index, the guide is quite adequate. The contents and index pages refer to section numbers instead of page numbers, which makes it awkward to find specific information.

Flipping Tutorial

A disk-based tutorial is provided to help you learn Wordcraft, with documentation provided on the Self- Instruction Work Cards. The cards are arranged in an easel format; you work through them by flipping them over and reading the front of each one. When you get to the last one you turn them around and flip through the cards to read the other sides. This is an excellent idea and the cards are solidly constructed so they should stand up to hard use.

The format of the tutorial is also unusual. You start with a couple of pages about word processing concepts and hardware, and are then referred to the *Installation Guide*, to a section headed 'Produce your first print in a few minutes with Wordcraft'. This overcomes initial fears of a computer. Once you've successfully completed this exercise, you start on the tutorial proper. Unlike some others it requires very little typing; rather than inputting large chunks of text, you are encouraged to experiment in your own way to find out how each function works.

The first five lines of the Wordcraft screen are used for control information. As some word processors use only two lines, you can imagine the information provided by Wordcraft is comprehensive. Unfortunately it looks cluttered; leaving out all the leading zeros would help.

Dual-mode Processing

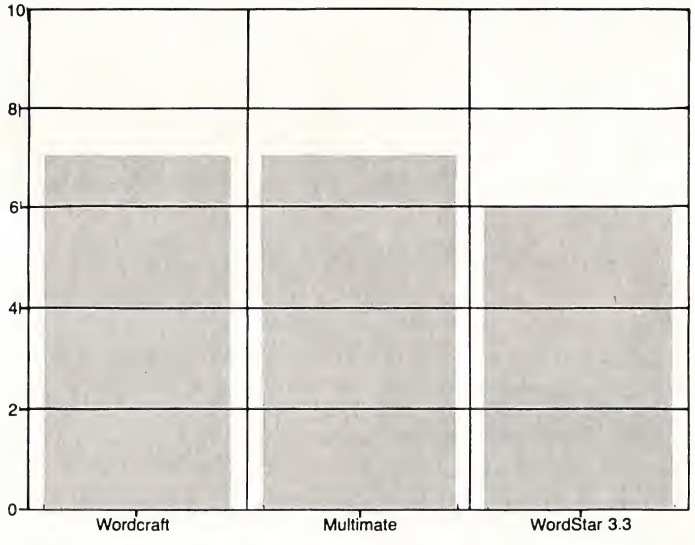
Two processing 'modes' are used and the screen always indicates which one is current. TYPE mode is for entering text, and COMMAND mode for entering commands; you toggle between the two by using the Esc key. This brings up the main problem with the Wordcraft tutorial, the allocation of keys.

The version of Wordcraft we had was for the IBM PC. The only part of the documentation specific to the IBM PC is the *Installation Guide*; everything else is covered only by the Operator's Reference Card which lists the keys for each command. So in the tutorial you find the statement "The Installation Guide will tell you which key on your computer is used as the TYPE/COMMAND mode key. Find out which it is before continuing." Some of the commands in Wordcraft are accessed by the Ctrl key, others by the Alt key, and for the life of me I couldn't find any logic behind which ones use Ctrl and which use Alt. To quote the tutorial again, "Throughout the rest of the topics in these Work Cards, the word CONTROL will be used for the control key. You should keep the Reference Card by your side to see exactly which key is used on your machine." This isn't confined to the tutorial either; every reference in all the manuals says Control when it could be the Alt key or something entirely different. Although I imagine this would be no problem after you've learnt the program, it means that until you do you have to keep the Reference Card handy at all times. The template supplied by Wordcraft is laughably inadequate; it covers only the first six numeric keys which are used in conjunction with the Alt key to turn underlining and boldface on and off, use decimal tabs and start indent – I suppose these are the most commonly used commands. Perhaps they had the templates left over from some other computer.

The ten IBM function keys are mapped to a set of ten 'soft keys', labelled along the bottom of the screen in the fashion used by Hewlett-Packard. There are six such menus: a Default menu that appears

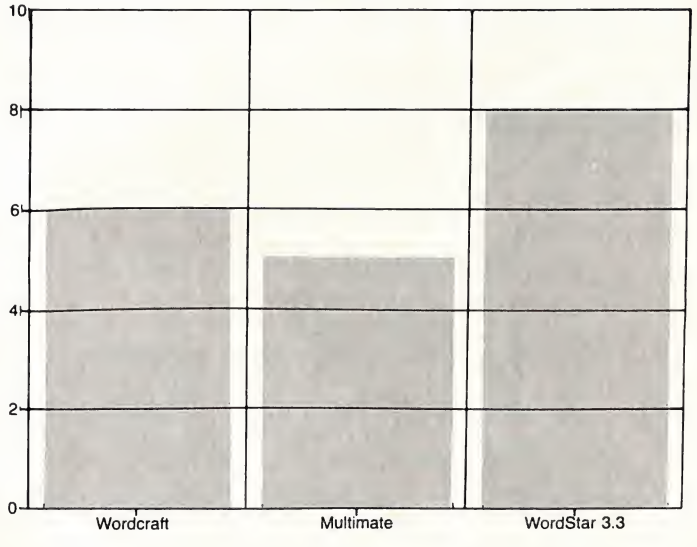
SPECIFICATIONS AND COMPARISONS

EASE OF USE

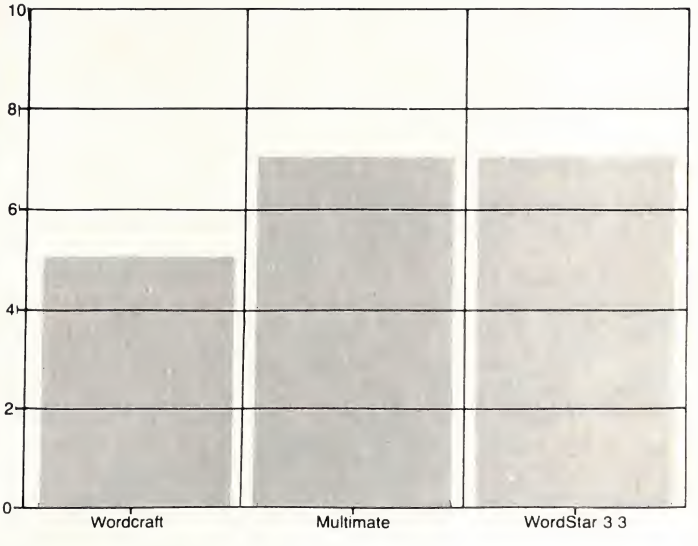


Package:	Wordcraft
Made by:	Dataview Wordcraft Limited
Hardware required:	Any 16-bit computer running MS-DOS with at least 128 Kbytes of memory (256 Kbytes recommended).
Price:	$750
Review copy from:	Personal Computer Services, 26 Ridge Street, North Sydney 2060; (02) 923 2899.

SPEED



DOCUMENTATION



when Wordcraft is first loaded, an Alternative menu including delete and undo functions, and Search and Replace, Ruler, Spelling and Calculation menus. The soft key can be turned off if desired. In fairness, I must say that no function-key template could cope with six menus.

It's Normal

The normal word processing functions are well catered for with Wordcraft. You can move the cursor by word, line, sentence, paragraph and document, or you can go to a specific page. You can delete characters, words, to the end of a line, the whole line or by the sentence. All normal formatting options are provided and the program supports proportional spacing. Standard paragraphs may be stored (up to a page in length), mail-merge printing is provided. ▷

Underlining is shown as underlined and all other attributes are shown in reverse video.

The sequences selected from the COMMAND mode include file functions such as GET, SAVE and REPLACE, and allow you to access the Help screens, change format and disk parameters, RUN outside programs like FORMAT and CHKDSK, use communications, modify or delete Help screens, and use the dictionary and spelling checker.

Implementing Wordcraft on the IBM PC poses some problems to the operator, since some key usage is counter-intuitive. 'Home' takes you to the start of the current page, while 'End' deletes to the end of the current line. 'PageUp' moves to the end of the previous page, but 'PageDown' moves to the start of the next page. 'Altw' moves to the start of the next word, but 'Ctrlw' deletes the word under the cursor. These two are easy to confuse. An effort has been made to use mnemonic codes, but not all codes can be made to fit this logic.

Healthy Prejudice

Let me digress a little, to tell you of my current prejudices about word processors. The first is I don't like programs showing control characters on the screen which muck up the appearance of the page. I don't mind them if they can be turned off, but I don't want them present all the time; I want to be able to see how the page will look without them. I don't really care, though, if the page is shown justified or not. Second, I want to be able to save a document to disk and return to entering text with a minimum of keystrokes, so that I'm encouraged to back-up frequently. One keystroke would be ideal, but I'm prepared to settle for two or three. Finally, I want the program to be filed in ASCII format with a minimum of special characters, so I can read the file from DOS, and so I am not restricted to using the speller that comes with the program.

Applying these criteria to Wordcraft we find underlining is shown as underlining, and all other attributes are shown in reverse video. You can display control codes, which appear on the line above and are separate for line controls and text controls. To save a document the first time you use the SAVE command, but subsequent attempts to save merely give you the prompt 'File already exists'. You use the REPLACE command, but you have to enter the filename again. There is no automatic back-up file created. This arrangement does not encourage the user to make frequent back-ups, although, on the other hand, your file remains on the screen all the time. The file is saved in ASCII format. So under my requirements Wordcraft scores two out of three.

The Proffered Spelling

One of the features advertised by Wordcraft is its use of an English dictionary, instead of the American version found in most word processors. I don't worry about this myself, as you can usually add words with the English spelling to the dictionary, but I suppose I would be more concerned if I had a secretary who habitually typed color instead of colour.

Spelling checkers seem to fall into three categories: the first contains all variations as separate words (apple, apples and print, prints, printed); the second uses separate prefixes and suffixes (reuse -d, -s) to cover variations. The third converts each letter to its ASCII equivalent, multiplies it by 3.14159, takes away the number you first thought of, and if the result is exactly divisible by 7 the spelling is OK.

Wordcraft uses the first approach, and offers most of the options of the best spelling checkers – next word, add to dictionary, enter correct word, change word. It doesn't suggest alternatives, but it does display "the section of the dictionary that should contain the word". This is the full line display, and usually has at least two words on each side of the word highlighted. If the word you want is not on the screen, you can scroll through the dictionary with the cursor keys. Of course, if you have the first letter of the word wrong (rong), this won't help. I found it fascinating to scroll through the dictionary to see which words have plurals and different tenses included – some have only plurals – presumably the dictionary makers have taken a count to see which variations are those most commonly used.

A Review's Not a Review When ...

The version of Wordcraft we received was a special reviewer's version, which didn't allow printing. Ironically, this limitation has somewhat restricted my ability to review the product; I have not been able to write this review using Wordcraft, a procedure that shows up more clearly the advantages and disadvantages of a word processing program, nor have I been able to experiment with the 'Printer Definition Files', which take up a large part of the Wordcraft manuals. There are 36 of these PDFs covering all the commonly-used printers, but in case your printer cannot be accommodated with these, the manuals explain them in sufficient detail for you to roll your own. However, the manuals state "if you do not have some programming experience it is recommended that you do NOT attempt to create PDFs of your own." After looking at the manuals I think this is a wise suggestion; you could save yourself a lot of time by asking your dealer to provide you with a PDF for your printer and demonstrate to you that it works properly with your printer.

Any program as comprehensive as Wordcraft is hard to assess until you have used it for a long time, to see if you are prepared to put up with its quirks and shortcomings. Any shortcomings are more likely to be in its manner of operation rather than the lack of a particular feature, because it is difficult to think of many features that are not included. The only omissions that come readily to mind are automatic footnotes and automatic generation of a table of contents.

At an Australian price of $750, Wordcraft is in direct competition with WordStar, which in its Propak guise had a recommended retail price of $795 (although discounting on WordStar is common and prices are expected to fall even lower with the recent release of WordStar 2000). With Spellbinder at $695, WordPerfect at $650, and Multimate at $595, the top end of the word processor market is rather crowded. If you are enamoured of WordStar you probably are not looking to change to anything else. However, if you have not yet developed a user's prejudice for the package you're now working with, and if you are prepared to spend $750 on a word processor, have a look at Wordcraft before you make your decision. (You might even decide to wait till our May edition for my review of WordStar 2000.) □

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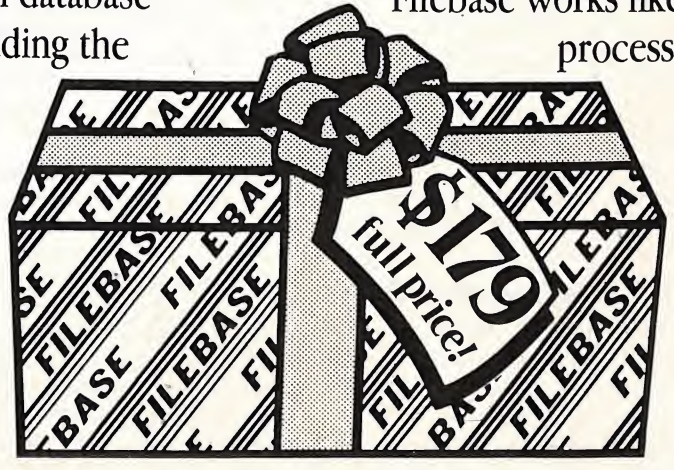

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THE PRESIDENT 16-210

Frank Lee took a long ride with President's latest IBM PC *clone. Through dust and heat and wind and Balladonia ... it kept on going.*

THIS IS A brief product review with a difference. As many of you will remember, I parted with my favourite Columbia MPC some months ago in favour of another clone – the FOX 2010. This move was prompted by the fact that I needed very little extra to make up the difference for a machine with a hard disk. The Fox was a temporary move. That machine has now become the President after a number of revisions and improvements. For some reason, the name Ronald seems appropriate for this new machine. I call him Ron because we're on reasonably close terms. Officially, he is a President 16-210.

Ron is as close a clone for the IBM PC as I've yet met. He sports 512 Kbytes of main memory, two double-sided floppy disk drives, and an integral half-height 10 Mbyte hard disk. There is still room for a second hard disk if my bank account can run that far. The unit has one serial port, a parallel (Centronics) port, and a game adapter (for a joystick which I have yet to obtain). It has a CAF RGB monitor, and a Keytronics keyboard with a very nice feel. There is also a Microsoft mouse card installed. That mouse has certainly been around the traps: first in the old Columbia, then the Fox, and now Ron.

Most of the President's goodies are on a 'multifunction' card. This card has the input/output ports, the battery-backed clock calendar, the game controller, and 512 Kbytes of memory.

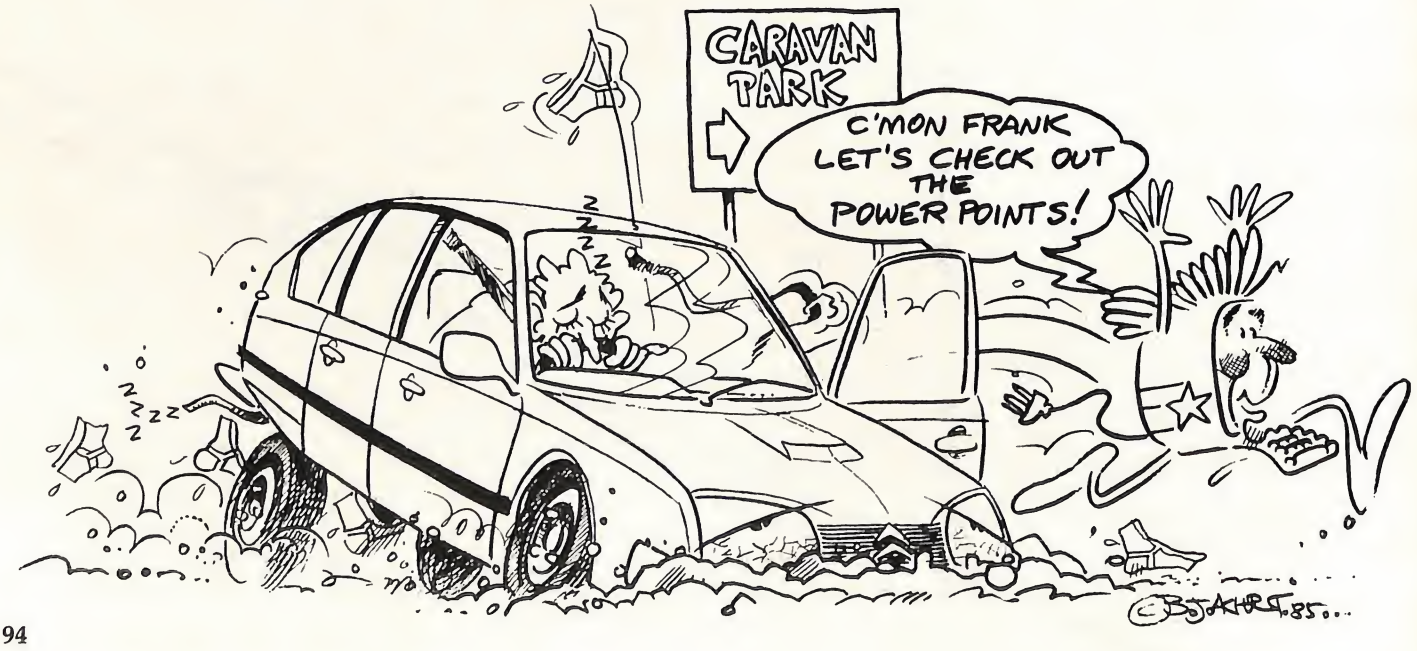
When I say this is a review with a difference, I mean it quite sincerely folks. This is the first machine which I have ever lugged across the Nullarbor by car, and back! And it survived! Perhaps better than myself or Citronella (my wretched Citroen). And in temperatures in the high 40s.

To Cross the Nullarbor

Last December the whim came upon me to take a break away from it all. I needed somewhere quiet, where the telephone was not. What better place than the Great Outback? I'd never done it, so why not now? Not being quite sure where Citronella would take me, I packed my tent, sleeping bag, Bankcard and Ron and took off for the mulga. As I passed through Bathurst, Cowra and Mildura, the urge to 'do the Nullarbor' was irresistible. On through Renmark, the Barossa Valley then Port Augusta, just north of Adelaide. After leaving Ceduna things got decidedly hot. While the car air conditioning worked just fine in the heat of the treeless plain, I'd forgotten to pack an air conditioner for the tent. Just a slip, but it put real pressure on Ron. I'm sure I was running him at well over his recommended maximum temperature. By camping at caravan parks with powered sites, there was never any trouble obtaining 240 volts. No doubt some of those supplies were not quite SCC standard, but Ron never gave a hiccup.

By the time we'd reached Perth (via Esperance and Albany), the temperature had settled in the mid to high 30s, and I had found cheap digs for a couple of weeks to give me time for a concerted bash at my Program Which Will Solve All the Evils of This World. Progress on the program was just great. The hard disk worked like a dream, and the extra RAM was useful as an M-Drive for holding frequently used utilities and overlays.

Two weeks later it was time to start the return journey. By then the Great Program



was 80 per cent finished, so I headed back in high spirits. That is until I hit a Spot of Bother just outside a town called Balladonia. I know, you've never heard of it. So you'll know where it is, it's about 200 km east of Norseman (in West Australia) and 200 km west of Cocklebiddy. It has a population of about 14.

How many times have you been told "Always carry a spare fan belt"? Nobody ever told me. Spare spark plugs, light bulbs, nuts and bolts, and a great tool kit – but no spare fan belt. You guessed it. It broke. Being only 20 km out of Balladonia, I drove very very slowly in the hope that Citronella would make it in intact. With one eye on the temperature gauge, I stopped regularly and let her cool down. By the time I arrived at Balladonia the old lady was very hot indeed. So was I. So was Ron. I let Citronella sit in the shade for a few minutes, then removed her water cap. Alas. I should not have. There was a sudden whoosh and an ominous Bang. Yup – the head gasket had sprung a leak, and all four cylinders had two inches of water inside them.

Balladonia, you should understand, is not exactly equipped with either spare fan belts or head gaskets for Citroens. You'd have as much chance of finding a spare 8088 chip there as you would parts for Citronella.

Ronnie Saw it Through

Thus it was that I spent four days in the Balladonia Motel, either waiting for parts to be sent from Sydney, or sweating it out under Citronella's bonnet. When not bathing myself in car grease or removing the skin from my knuckles with a spanner, I amused myself by refining the software which I had nearly finished in Perth. President Ron took it all in his stride. He had been bundled in and out of the car so many times, he must have got giddy. I know I was. But Ron never fell over.

To my surprise, and to the surprise of the garage people at Balladonia, Citronella finally made noises like a real car. Again I headed for the Nullarbor, and after a few more heat-related problems made it back to Mount Crisis. The President was still in tip-top condition (and fit for another term of office). I had half expected the hard disk to crash from all the vibration and temperature extremes (the desert gets extremely cold at night) But all was well. That's what I call a real road test.

Incidentally, here's a tip for when the heat's so bad that your petrol vapourises

SPECIFICATIONS

Unit:	President 16-210
Made by:	President Computers
Processor:	Intel 8088
Clock speed:	4.77 MHz
RAM:	512 Kbytes
I/O:	1 parallel, 1 RS232, 1 games
Languages:	GW BASIC, COBOL, FORTRAN, Pascal
Keyboard:	IBM PC compatible
Display:	14 display modes
Best points:	Close as you'll get to an IBM PC; reliable; serviceable; excellent keyboard
Worst points:	Documentation
Options available:	10 Mbyte hard disk drive, Intelligent Video Monitor, local network system, President modem
Extras included:	President Eazytype, Perfect Series software, two 360 Kbyte floppy disk drives
Price:	$4400 (with green phosphor monitor)
Review unit from:	President Computers, 100 George Street, Hornsby 2007; (02) 476 2700.

Ratings	1	2	3	4	5	6	7	8	9
Documentation:									
Ease of use:									
Functionality:									
Support:									
Value for money:									

before getting to the engine. Citronella is fuel injected, and has an electric petrol pump under her running board. The fuel was vapourising in the pump. I managed to find a spare pair of underpants, doused them in water, then wrapped them around the petrol pump. Being in the air stream, the cooling effect was sufficient to stop the vapour lock problem. Pity about the underpants. I had to pop out and douse them every 20 km or so.

Cleaning up the President

One of the first things done on returning was to take the lid off the President, and make a visual inspection of his innards. As expected, there was a lot of accumulated dust. Red dust in particular. That worried me. Red dust contains iron oxide – a reasonable conductor, and difficult to remove because it is magnetic. In spite of that, the dust came away with a damp rag after I had removed all the plug-in cards. Fortunately, the hard disk interior is hermetically sealed and well protected. The floppy disk drives were another story. Their innards were caked with nasties (including the odd insect). Both had to be pulled apart and carefully cleaned with a soft paint brush and isopropyl alcohol.

The President machine has eight slots, two of which are short. One of my short slots is occupied by the mouse card, leaving one spare. The remaining (long) cards are the multifunction card mentioned above, the colour graphics card, a floppy disk controller, and a hard disk controller. That leaves spare a total of two long slots and one short slot.

By the time this review hits the press, President will have released its portable version of this machine. I understand it has only five slots, so that in my configuration there will be no slots to spare. On the other hand, it has a built-in high-resolution green-screen monitor and two half-height floppy disk drives. There is room for a 10 Mbyte hard disk as well.

The only complaint I have about my President is his documentation. When I last spoke to the people at President, they said the documentation was being rewritten, and that it would be available Real Soon Now. I believe. Meanwhile, I'm happily running DOS 2.11 and a great number of applications. If I pluck up enough courage I'm going to tackle Concurrent DOS. It's been waiting quietly in its box now for over a month.

The President 16-210 comes standard with 512 Kbytes RAM, two 360 Kbyte floppy-disk drives, DOS 2.11 and Perfect Series Version 1 software. This package costs $4640 with a high-res colour monitor, $4400 with a green phosphor monitor and $4160 without a monitor. If you also want a 10 Mbyte hard disk, it'll cost you $6580 with a colour monitor, $6340 with a green monitor and $6100 without a monitor.

In summary, I'm pleased as Punch with Ron. He's excellent value for money, as reliable as they come, solidly engineered, and runs programs designed for the IBM PC. Most importantly, he runs the latest version of the Microsoft Flight Simulator – the real acid test. Now it's back to the garage ... □

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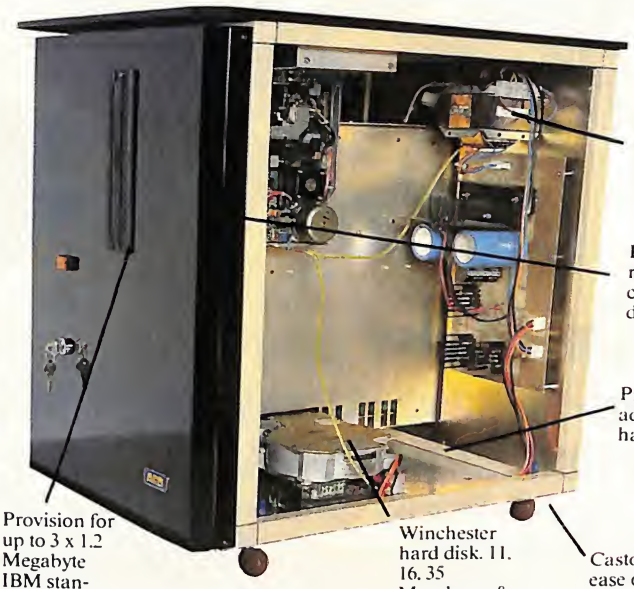

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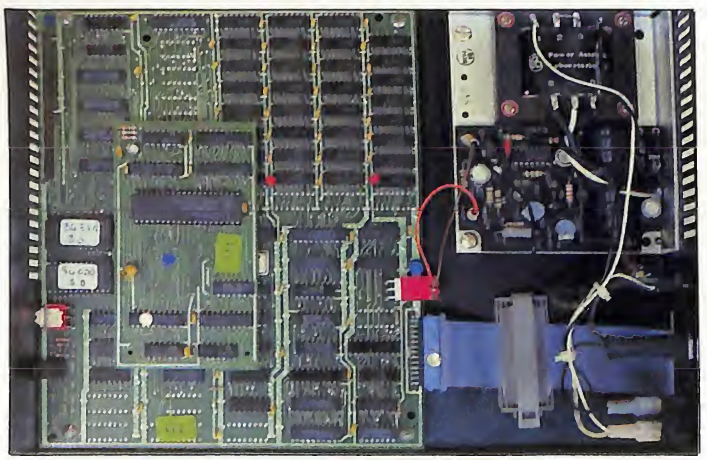
PROGRAMMED FOR ENTERTAINMENT

BIT BUCKET

Evan's monthly overview of the variety of products that arrives in our office includes a series of graphics packages for the Macintosh, a co-processor for the Z80 and a disk copier for Apples. Darren Challis has added a brief review of a mouse for the Apple II family.

CO16 CO-PROCESSOR

Distributor: Computer Transition Systems, 30 Alma Road, St Kilda 3182; (03) 537 2786.
Compatibility: Z80 machines
Price: from $1000



The Z80 may may not be dead, but it sure is getting tired. For those people who are feeling a little isolated as they plod along with their humble Z80, envious of all the software being written for other processors, the solution may be to attach a co-processor to give access to a broader range of software and power.

The CO16 is just such a processor, and works better than most. It offers the choice of an 8086 or 68000 second processor, and is claimed to connect to over 40 Z80-based microcomputers. In our case we were able to connect the 8086 to our Kaypro and be running in MS-DOS in a matter of minutes.

An adaptor board was piggy-backed from the Z80 slot on the Kaypro, with the processor board attached through a short 25-way cable. The co-processor has its own power supply and operates at 6 MHz. The Z80 continues to be of use as an I/O processor on the piggy-back board, giving an even greater level of performance.

Along with the co-processor you also get a large amount of extra memory on the same board. This starts at 256 Kbytes and can be expanded by half a megabyte. It can be used from CP/M as a RAM disk, giving even faster access times than a hard disk.

Operating systems that will run with the CO16 installed are Microsoft's MS-DOS and CP/M-80. The 68000 runs CP/M-68K. This allows the user to run a large number of the commercial packages that operate under these systems. In addition to the operating systems there is an IBM PC emulation mode which emulates the IBM PC BIOS ROM. This is not a copy of the ROM, only an emulation, so there will be programs that will not run under it. Programs that make use of the graphics chips in the IBM, or which make direct address calls, may not run either.

It is also possible to emulate MS-DOS disks with your CP/M machine. A number of disk formats is provided, one of which should suit your needs. If you have a hardware-compatible drive you may also read IBM disks. Another useful feature is an MS-DOS logical disk emulation, used to provide you with the files that are required for MS-DOS on a CP/M format disk. This area can be installed on a hard disk although its regular use on floppy disks is not recommended. □

THE ESSENTIAL DATA DUPLICATOR III

Distributor: Utilico Software, 83 Hall Street, Bondi Beach 2026; (02) 30 2105.
Compatibility: Apple II and III machines
Price: $98.95
Application: Backing up protected disks

When you buy expensive software it's disconcerting to discover you can't back it up because of a copy protection mechanism on the disk. Manufacturers, justifiably wary of software pirates, use copy protection to safeguard their livelihood, but thereby put legitimate users at considerable risk without back-up copies of programs. Even the ability to make one or two copies only may not be enough in some circumstances, as we at *Your Computer* recently discovered.

In our case the company decided to build new offices above our existing ones, and in the process many of our disks were corrupted as a result of the amount of heavy dust around.

Copy programs have become necessary in order to avoid this kind of hassle. The Essential Data Duplicator III (EDDIII) lets you copy programs for the Apple II and III range, and has a number of features that make it extremely good at copying protected programs. It uses a track-oriented copying technique, with analysis of the source disk and track deletion on the destination disk. For added insurance the program will not operate on a non-write-protected source disk.

The Essential Data Duplicator does automatic nibble counts, to try and ensure the length of the duplicate tracks is the same as on the original. This can also be done manually, to help you adjust the drive speeds and improve your chances of getting good copies.

A number of helpful details is displayed on the screen, but, as the manufacturer admits, it can happen that something the display says has copied correctly may fail completely, while something supposed to be wall to wall with errors works perfectly. That's life, I suppose.

The documentation for the EDDIII could be much more clearly written. I found the manual potentially instructive, but overwhelmingly boring, repetitive and convoluted

On the other hand, one of the best features of the package is the enclosed list of programs currently known to copy using EDDIII. The required parameters for setting up EDDIII are also given, making it much easier for those with limited knowledge of disk copying and copy protection to proceed, in ignorance of the whys and wherefores, and still achieve results.

As is usual with disk copying, our attempts at actually duplicating disks met with only partial success. For example, when we copied one disk with six programs on it, only three worked. We aren't experts on Apple copy protection, but we found that the ease with which we could experiment, try again and eventually succeed was a major bonus

DA VINCI GRAPHICS

Distributor: Imagic, Unit 8, 93 South Creek Road, Dee Why 2099; (02) 981 2744.
Compatibility: Apple Macintosh
Price: $89.95 each, except Commercial Interiors which costs $260
Application: Computer-aided design

Many of the packages coming onto the market for the Apple Macintosh take advantage of the Mac's high-quality graphics capability, its visually oriented style and its use of icons. However, few do it at the level of the da Vinci Graphics Series for artists, architects and designers.

Each of the packages in the series provides a set of around 400 images that can be used with Macpaint to design and plan anything from a garden setting to an entire city. These are arranged by type or style, and can be transported to Macpaint for manipulation.

For example, the Building Blocks package gives designers the basic elements of about ten architectural styles with which to design major buildings. You select a particular style, choose the images you will need to produce a completed building, and copy them into the Macintosh scrapbook. Then you go into Macpaint to interconnect the images.

The styles you can choose from in this package are house blocks, building blocks, Bau blocks, Gotham blocks, palazzo blocks, villa blocks, garden blocks, water blocks, city blocks and country blocks.

When using the images, you can modify them using many of the Macpaint features. For example, flipping, inverting, rotating or filling in blocks produces many variations, and allows greater flexibility in using the blocks. If the features of a block are not quite right, Macpaint can be used to change them.

The packages in the da Vinci series are all well documented, and it doesn't take long to learn to use them. Only a small part of the manuals is instructive; the majority of pages is devoted to information on the pictures themselves and the options available to produce even more variations. The manual does spell out the need to build images from the background to the foreground, as overlaying pictures means the one last laid down will take precedence over all others. Once you get this concept straight, building pictures is not difficult, but early attempts can look quite a mess. The Macpaint lasso can produce transparent overlays which help reduce this problem while providing even more flexibility

The staff selection criteria at *Your Computer* place only slight emphasis on knowledge of architecture, so our judgment of the usefulness of the da Vinci series is necessarily limited. However some of the packages have an appeal that extends beyond the needs of the professional. For example, the packages Buildings, Landscapes and Interiors could easily be used by a home owner interested in designing a house or garden layout. These packages will give you a polished design with the opportunity to change ▷

things and experiment and so get a much better idea of the final appearance than a simple line drawing would give.

Having seen a number of friends slaving over designs at the School of Environmental Design when I was at college, I'd say some of these packages have been tailor-made for them. Using them, anyone could whip off a very passable design in less time than it normally takes to carefully draw in a tree.

One possible drawback of the series is its American emphasis. Australia has a number of unique architectural styles, both indigenous and highly modified, which are not catered for in the da Vinci packages. Other styles in the packages are not common in Australia, and a buyer with specifically Australian requirements would do well to check the packages' usefulness first.

The da Vinci series, like many other Macintosh packages, treads a fine line between the strengths and limitations of the Macintosh computer. The packages run slowly, but in return you get some extremely useful tools. For your investment in time you get very high-quality graphics in much less time than it would take the average designer to draw them, with the bonus of being able to manipulate them.

The packages currently available in the da Vinci series are: Landscapes, Interiors, Buildings, Commercial Interiors and Building Blocks. The series is available from most Apple dealers. □

Software	Publisher	Versions
Summer Games	Epyx	All versions
Dazzle Draw	Broderbund	All versions
Bank St Writer	Broderbund	Latest versions
Print Shop	Broderbund	Latest?
How About a Nice Game of Chess?	Odesta	All versions
Music Construction Set	Electronic Arts	Latest version
Pinball Construction Set	Electronic Arts	Latest version
Financial Cookbook	Electronic Arts	Latest version
Cut & Paste	Electronic Arts	Latest version
Wizardry	Sir-Tech	Latest version
Knight of Diamonds	Sir-Tech	Latest version
Legacy of Llylgamyn	Sir-Tech	Latest version
The Return of Werdna (Wizardry 4)	Sir-Tech	All versions
Appleworks	Apple	Proposed
Graphics Magician	Penguin	Proposed
Complete Graphics System	Penguin	Proposed
Catalyst IIe	Quark	Proposed
Word Juggler IIe	Quark	Proposed
Home Accountant	Arrays/Continental	Proposed
Tax Advantage	Arrays/Continental	Proposed
The CPA Series	Arrays/Continental	Proposed
Property Management	Arrays/Continental	Proposed

— plus a proposed graphics toolkit based on Lisa's Quickdraw, by Bill Budge.

Figure 1. Software compatible with the AppleMouse II, either available now or planned for the future.

APPLEMOUSE II

Distributor: Apple Computer Australia, 37 Waterloo Road, North Ryde 2113; (02) 888 5888.
Compatibility: Apple II machines
Price: $145 (IIc), and $216 (others)

One of the most definitive features of Apple's Lisa and Macintosh computers is their mice, and owners of the earlier Apple II family will be pleased to hear there is now a mouse for these computers. The AppleMouse II will work on all IIs and IIcs, and for earlier machines you need at least 64 Kbytes of RAM.

The mouse has the same technical features as the Lisa and Mac mouse, but is a different shape. The whole mouse is beige including the button, and the main moving part is a steel ball, coated in rubber, which is held in its hole by a removable rim. Removing this rim enables you to free the ball of dust which may get caught in the hole during use. This constitutes the entire 'care and feeding' of your mouse.

The user is introduced to the mouse via the MousePaint software included in the package, but you shouldn't confuse this program with a demo. As the name suggests, it is a drawing program, based on the Macintosh's MacPaint. It was written by Bill Budge, the same programmer who gave us Pinball Construction Set, with its Lisa-like icons, before Lisa was around. His graphical genius is clearly shown in this program, which is elegant and fast, and handles the mouse well.

MousePaint only works on Apples with 64 Kbytes or more because it's ProDOS-based. Apple's new DOS stores itself in the upper 16 Kbytes of the IIe (the upper 16 Kbytes of the lower 128 Kbytes of the IIc) or in the 16K language card of a II or II+. The mouse itself does not need 64 Kbytes of RAM, but if you spend so much on the mouse, you might as well be able to use MousePaint.

The AppleMouse II package comes with the mouse, manual and MousePaint, plus a controller card. The AppleMouse II card can go into any slot, but the manual recommends slot four. The IIc was released after the AppleMouse, so its 'mousetronics' are built into it, which makes its package much cheaper than the II, II+ or IIe's as it has no need for a controller.

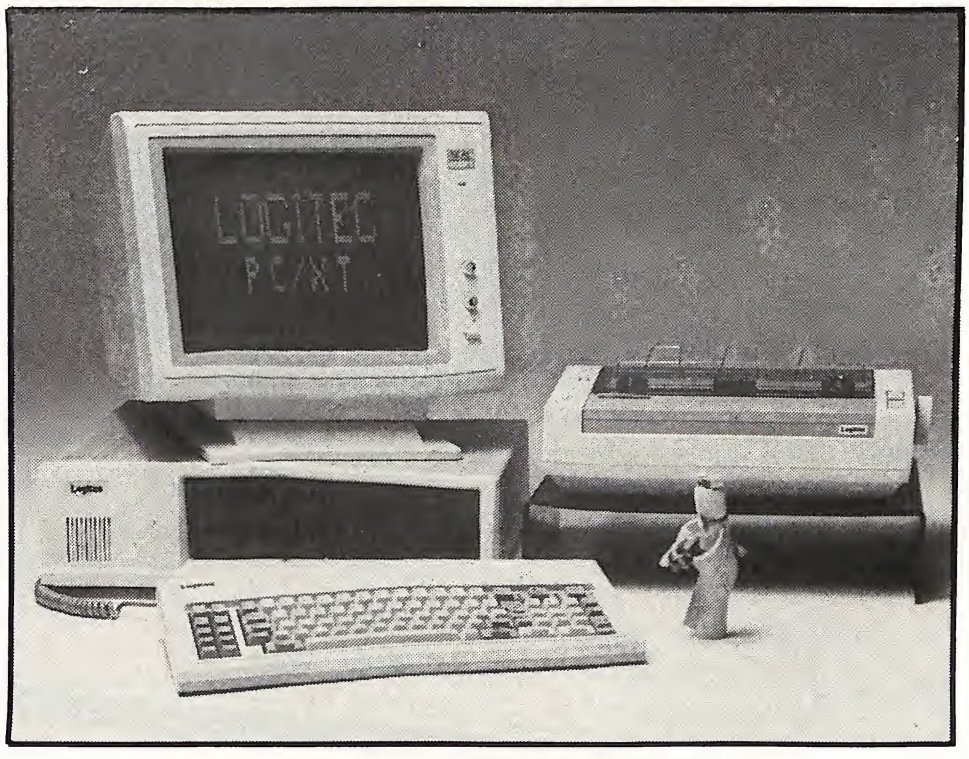
According to the manual, you need about 30 sq cm (1 sq ft) of desk space to use the mouse.

Mouse Software

And now for the big question: software. Figure 1 is a partial list of software which is now, or will soon be, mouse compatible.

Is the mouse worth it? My answer to this would have to be yes, although if you have a IIc the price certainly makes it more attractive than otherwise. For the IIc the price is $145 plus tax, while the II, II+ and IIe version costs $216 plus tax.

I have also evaluated a cheap Taiwanese copy called 'Graphics Mouse', which just doesn't compare with the AppleMouse. It doesn't work with any current software, has no interrupts, is very slow, and the software just isn't in the same league. Its price, however, is about $85. Despite its relatively high price, I believe the AppleMouse II is a worthwhile peripheral for Apple II users who want to get the most out of their computer rather than upgrade to a later model, such as the Macintosh □



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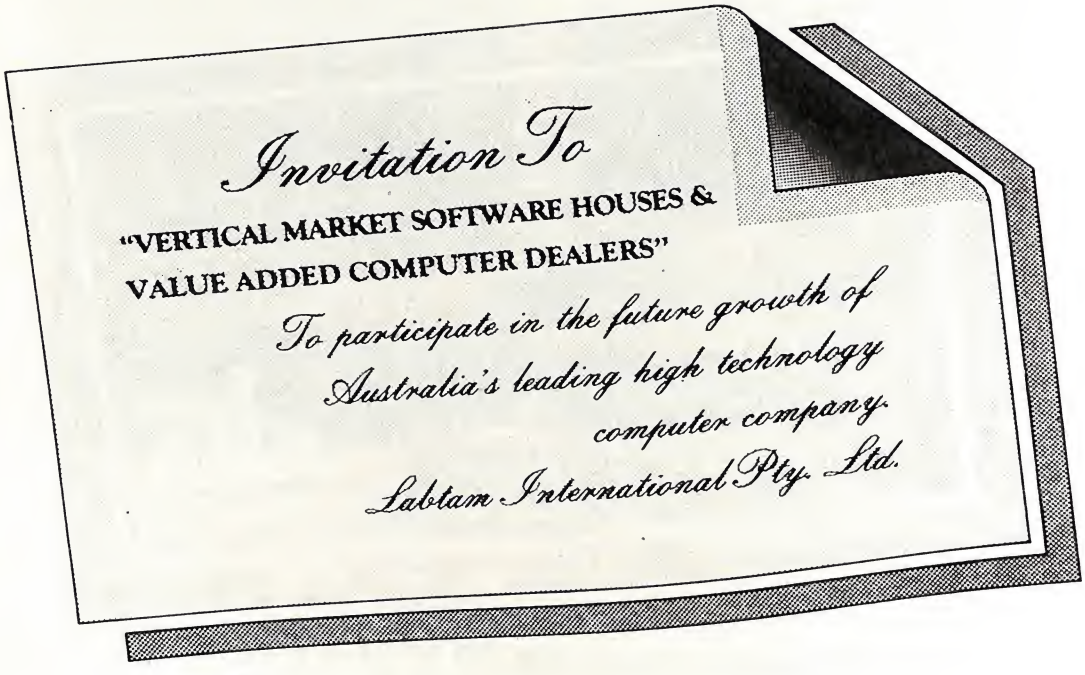

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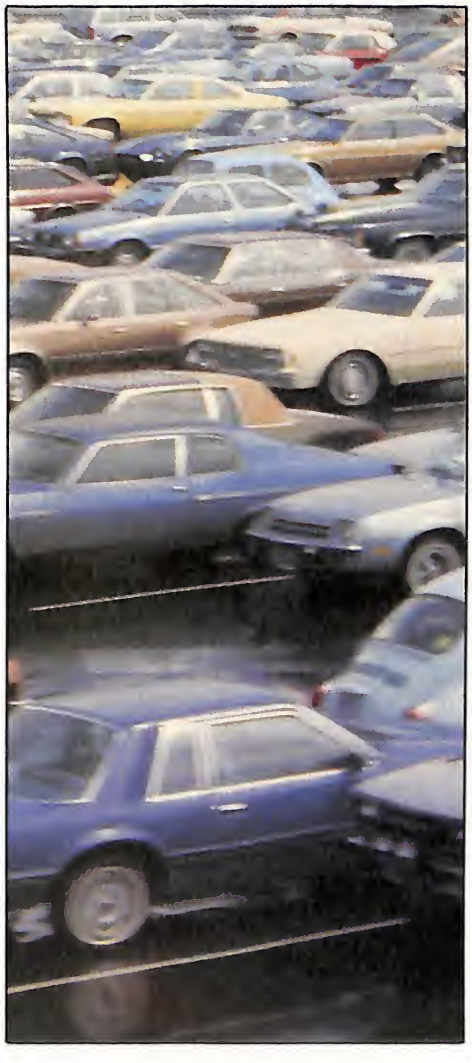
Business

Micros Join the NRMA ____ 106

How does a huge organisation go about developing a workable computer system? The NRMA *began with a base of* IBM *and* IBM*-compatible mainframes, and gradually added minis and micros. The forseeable result will be lightning fast customer service and improved in-house operations.*

By Norman Kemp



Buying a PC for Business ____ 117

IBM, NEC, *Olivetti,* IBM, *Texas Instruments, Apple,* IBM, IBM, IBM ... *There is a bewildering number of potential business machines from which to select, and sometimes it may seem there is only one safe choice.* But *let's take it back to basics and a logical progression of criteria, and you're more likely to get a machine to really suit your needs.*

By Les Bell

Viatel Grapevine ____ 127

Via-who? *The more you know about this new* Telecom *service for computer users, the more effective use you'll be able to make of it. The background story was in last month's* Your Computer. *The Grapevine, a regular business feature from now on, will keep you up to date on who's providing information on* Viatel *and what's new in specialised accessing equipment.*

By Norman Kemp

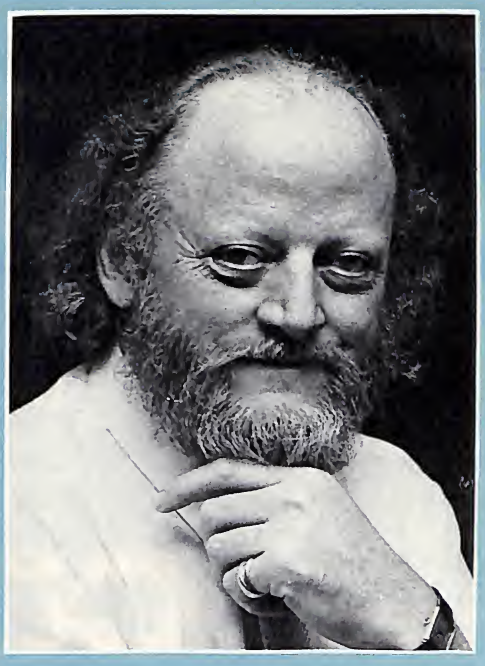
MICROS JOIN THE NRMA

BY NORMAN KEMP

With a membership of 1.6 million, all clamoring for different combinations of house, car, boat, caravan and other insurances, as well as occasional road service and travel arrangements, the NRMA would be lost without computers. The organisation recently began mixing and matching micros, terminals and mainframes to achieve greater internal efficiency and provide a better service to customers.

PROCESSING IN A large corporation is a complex operation and poses many problems that are still unresolved. According to marketers, the technology can be supplied by hardware and software companies in packages that just need a little time to cobble together; in practice, it requires the skills of scores of programmers, analysts and other data processing staff, over two or three years, to make up a workable system and have it running – even in organisations with the best planned financial resources.

Although microcomputers have become an accepted daily productivity tool in many small businesses, their place in large organisations has yet to be clearly defined. An ideal corporate processing strategy would involve contented users in a number of departments working with microcomputers or multi-functional workstations on spreadsheets, reports or word processing, while drawing their information from a vast central pool stored in the electronic vaults of a powerful mainframe. There would be ease of access to the information, little time lost in file transfers, data would be accurate and up to



The NRMA's Director of Information Services, David Riches.

date, and the job of handing over database material and answering users' queries would not cause the central processing site operations to skip a beat. It is a dream yet to be fulfilled, but the challenge is on. Scores of projects started within the past couple of years will be developed to become the forerunners of the electronic office necessary to meet the business requirements of the 1990s.

Australia's largest association for motorists, the National Roads and Motorists' Association (NRMA), is currently involved in a co-ordinated strategy combining mainframes, microcomputers, minicomputers and a variety of terminals in standalone and network situations, to handle its diverse functions.

An Early Romance With IBM

Computing has been at the administrative heart of the NRMA since the early 1960s, when it began with a massive IBM 1401 – a clanking primitive of a number-crunching machine which fed on punched cards until it was replaced by an IBM/360. The 360 was the progenitor of a sequence of online transaction-oriented IBM mainframes with densely-packed, integrated semiconductor circuitry providing immensely fast processing and reliability.

Though an exclusive IBM user for more than 20 years, the NRMA's central processing department changed its policy in 1984 to buy competitive but wholly IBM-compatible Amdahl 5850 mainframes. In contrast to the original batch system, which in the earlier days handled group processing over a leisurely period ranging from several days to a month depending on the application, the current equipment can receive, store and process information from offices, branches and depots at a speed of more than 14 transactions a second. The corporate volume of online data processing each month at NRMA head office as at November 1983 (the latest figures available) were: 31,000 changes of vehicle notifications; 22,000 changes of address notifications; an average of 108,500 membership renewal payments, 82,000 insurance renewal payments for motor vehicles, third-party property damage and caravans/trailers, 25,000 hire purchase and personal loan repayments, 46,000 Homesure payments, 2900 personal accident payments, 2200 life payments and 850 Boatsure payments. About 25,000 general record enquiries are handled each day. Most of the information concerning the NRMA's 1.7 million members is received from 27 branches and 258 depots. The NRMA estimates nearly 60 per cent of motor vehicles in New South Wales are covered by its membership.

One IBM medium-range computer has been retained for a specific purpose. A System/34, initially bought to handle accounts work, has been switched to travel department applications. It is scheduled to be replaced this year either with a larger minicomputer of the IBM System/36 or System/38 variety, or a power-equivalent personal computer.

The MIS Division

To advise on and co-ordinate the details of its internal office and branch computing, the NRMA has formed an innovative Management Information System (MIS) division. The division reports directly to the Director of Information Services group data processing manager, David Riches, who has had lengthy experience with large systems in commercial institutions. The MIS division is an amalgam of several departments; among them are communi- ▷

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"There was a lot of nervousness at first, and some people were not only embarrassed but scared to be seen putting a hand on a keyboard in front of others."

cations, systems development, computer services, security, and the administrative facilities of the training and accounts sections. Riches believes that over the past three years the NRMA has worked out its diverse strategies correctly, although there is a considerable mix of computers in a variety of different and not necessarily connected operations. Spearheading the planning of these systems is Communication and Planning department head, Ian Smith.

In its use of head office online systems software and support services, the NRMA is true to 'Big Blue', but it seeks and buys its general-purpose hardware on an open-tender, cost-efficient basis. The policy of compatibility with IBM is being maintained at desktop level, where the microcomputer selected by an MIS evaluation team for head office department and branch managers is the ITT Xtra Personal Computer – only shipped to Australia last November, with the NRMA one of the first test sites.

A Paler Shade of Blue

Classed as 'very compatible' with the IBM PC/XT, the Xtra has an ITT version of the MS-DOS 2.11 operating system, with a CP/M-86 option; 256 Kbytes of random access memory (RAM) as standard, expandable to 640 Kbytes, a 5 MHz Intel 8088 processor, dual 360 Kbyte floppy disks (or a 10 Mbyte hard disk option); five IBM bus-compatible expansion slots; an RS232 port and Centronics port; and a 36 cm monochrome monitor in green or amber, or a 30 cm RGB monitor. The keyboard has 84 keys with ten programmable function keys, ten command keys, five cursor control keys and a serial interface. The software chosen for the microcomputers includes a fourth-generation language, PC Focus, the financial modelling spreadsheet Lotus 1-2-3, the Open Access integrated package and BASIC Interpreter for programming.

To date, about twelve Xtras have been acquired for top-level department managers, but it is expected that by the end of the financial year June 1986 about 50 will have been budgeted for.

These will be used by a wide range of staff, and will have the capability of being linked as multi-functional devices to an office word processing system based on Datapoint 8640 processors, or to the mainframes to extend the facilities for information retrieval and sharing communications. The NRMA is using eight Datapoint processors with 34 screens and 13 printers in an internal Arcnet local area networking system for office word processing. Under the full plan the range of options available to users will be extensive, giving choice of whether the computer will be required as an online mainframe terminal, a word processing terminal for electronic mail (through the Datapoint emulation and Arcnet), or as a standalone unit for personal computing.

R Before D

The MIS division began its preparatory studies into the use of microcomputers in office departments on an unofficial basis. "The initial study was carried out by a part-time group of enthusiasts who saw the need to investigate the versatility of personal computers, and to define certain areas where they could be used in the organisation," Ian Smith said.

"We did not have a lot of experience with microcomputers, and in order to get some idea of what was required we implemented a project which we called 'the Clayton's Project' – that is, the project you have when you don't have one."

Early enthusiasm soon generated an organised survey, and within three months several brands of microcomputers were being trialled, until eventually one was selected as being most suited for the tasks of willing but bemused department heads.

By the end of the year the ITT Xtra had been cast in the role as group management desktop computer, and preliminary training had started for key executives and staff – many of whom had never even learned the layout of a typewriter keyboard. Says Smith, "There was a lot of nervousness at first, and some people were not only embarrassed but scared to be seen putting a hand on a keyboard in front of others.

"The biggest early problem was to convince the novices of the convenience and facilities available on personal computers, and just where the machines would fit into their departments. We had to overcome a huge confidence gap to assure them there was nothing so technical involved that office workers would have difficulty in mastering the skills. Given a few months of practice and experience, the confidence level is increasing at a rate of knots. All the managers are now very supportive of personal computer concepts, and they have learned that when they make mistakes or get into difficulties they can usually work their way through unaided."

Areas where the Xtras are now being fully employed include research and underwriting, personnel, traffic and safety, and accounting departments.

Smith is careful not to over-recommend computers. "There are scores of good applications that should go onto PCs, but there are also a lot that should not," he says. "Some things can be done far better by manual systems and we have to be careful about changing those. The first thing we think of when analysing a situation is whether the application really is one for a personal computer. If it is, we go ahead and organise it. Our experience has shown us not to change systems simply for the sake of putting them on computer, but only when there is a need and the user is willing to spend the time learning the new method." ▷

Easing the DP Load

A characteristic of computing departments in almost any organisation is the backlog of programming work that builds up when new demands are made, or when the existing systems need to be expanded or amended. Implementation of forward projects or testing of new programs is often delayed in organisations where the data processing department is continually being asked by external departments and management to produce information or devise alternative systems.

Says Smith, "I don't believe that spreading PCs around offices will truly eliminate the backlog problems. But they do divert users from wanting to try out some new scheme, or from requesting a report or analysis from the mainframe – thus occupying the time and efforts of the data processing staff – when they can do it on their own machine.

"In fact," he continued, "PCs will probably generate and handle numerous applications which haven't previously been identified. They're not the answer to the backlog problems in the central data processing department, but they can take some of the load and provide other avenues for working."

One of those other avenues may well be use so-called lap, or 'kneetop', computers, on which executives can work at home. "Some of them can't spare the time at work to learn the computer programs," points out Smith, "but they could practice after hours and try out various ideas. When they get their word processing or spreadsheet finalised they could use the lap computers to transfer information and communicate with the office Xtras. Conversely, they could download a spreadsheet from the computer and take it home."

Smith discounts the suggestion that executives taking work away from the office is an American practice which most Australian executives would prefer to avoid. He says, "There is always something that has to be done after hours, and senior management people can't get away from it. The lap computer might be a perfect complement to the office desktop computer, and could save a busy executive a lot of time."

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ters into the NRMA is a major task, it will take second place to the completion of the BONUS (Branch Online Updating Service) project which has been under development for three years and is due to be completed in 1985, having occupied the equivalent of 100 man-years of work. The NRMA has 27 branches and 258 depots, which are being equipped with a network of ITT Courier 2790 terminals (compatible with IBM 3270 terminals), and an order has been put through for later Courier 1900 series models.

While all branches will eventually be online, the initial terminals will be installed in around 20 of the organisation's busiest branches, which handle approximately 60 per cent of the work. Having these offices online will enable thousands of customers each day to have their membership, insurance and other questions answered virtually immediately. To improve systems development productivity, the Informatics Mark V fourth-generation language, which is an online applications generator for IMS DB/DC systems, has been implemented between the terminals and the mainframes. STC supplied the terminals and equipment for the BONUS project.

The Road Ahead

The NRMA is involved with other important data processing operations not connected with its office systems. For the public the most vital of these is a computer-aided despatch system for road patrol service, based on a Digital Equipment VAX operating with microwave links from the NRMA's despatch centre at Villawood (on the outskirts of Sydney).

In search of a solution within its own organisation for problems related to the high cost of motor insurance claims, the NRMA has developed a commercial vertical market package, using Dataflex as an applications development tool, which it hopes will reduce the costs of claims and quotes after road accidents.

The NRMA marketing division is now doing final testing on a computerised system for smash repair shops. Called 'Compuquote' the system will enable repair shops to standardise and regulate their costs and price quoting, with the added convenience of being able to store their other bookkeeping records on it. Currently Compuquote has been developed on a NEC APC III, but it is being adapted for the IBM PC and is expected to be released publicly around April this year.

"The NRMA has a five-year directional corporate plan, but there is no distinct strategy for office automation at the moment," Smith said. "Office automation can be extremely difficult to justify, and our only strategy there will be to build according to a department's needs. Once equipment that can be justified by a department or at branch level is in place, it will be networked to give added value capability – such as electronic mail or telex services." The long-term objective of the NRMA will be to develop a corporate network capable of carrying voice, text, data and images, using third-generation PABX as gateways into branches, and microwave technology where suitable. □

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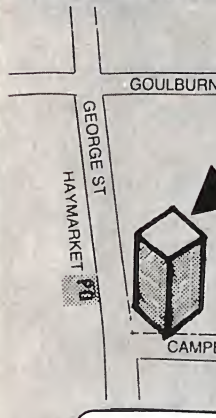

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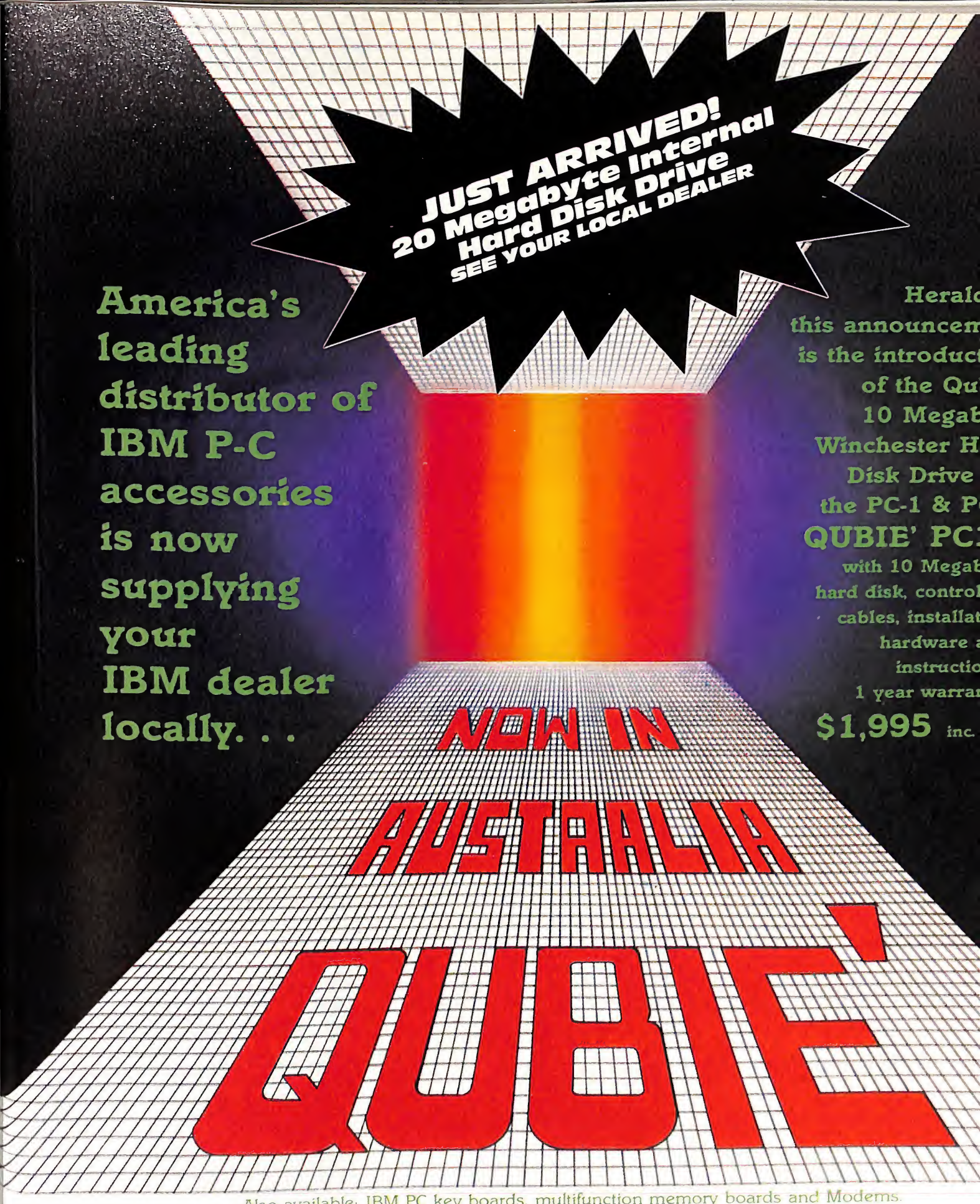

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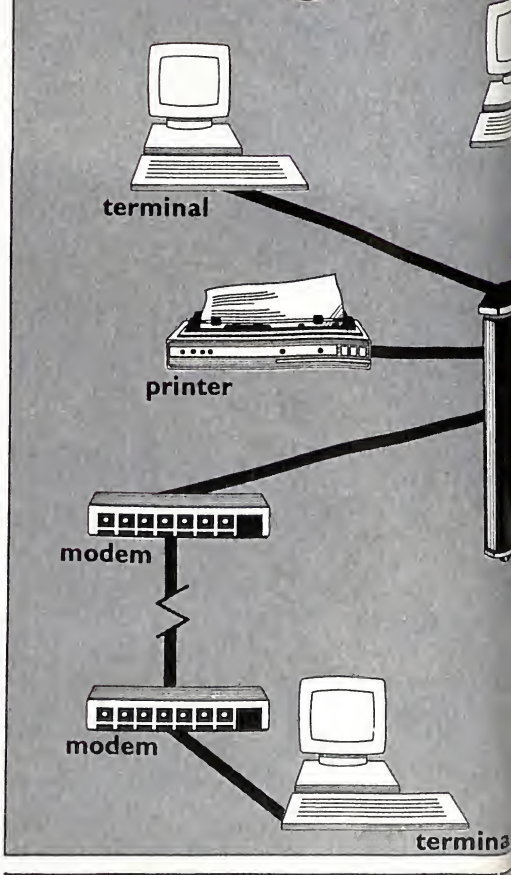

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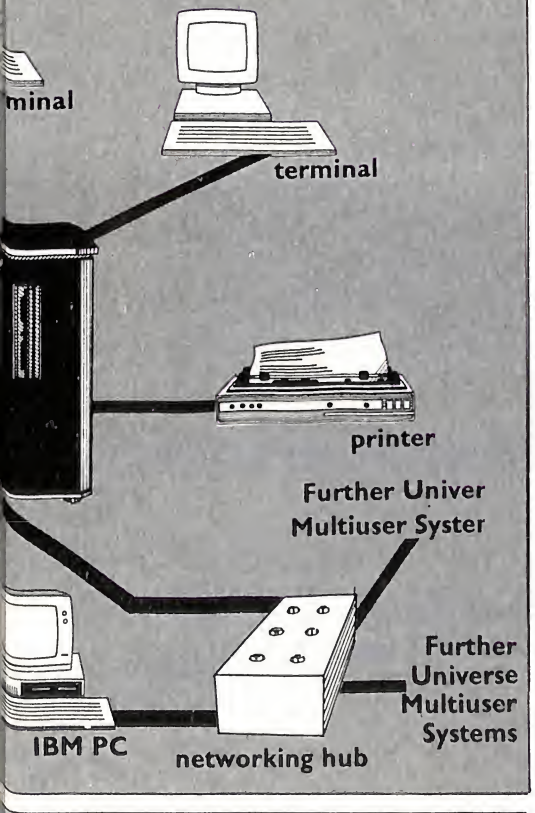

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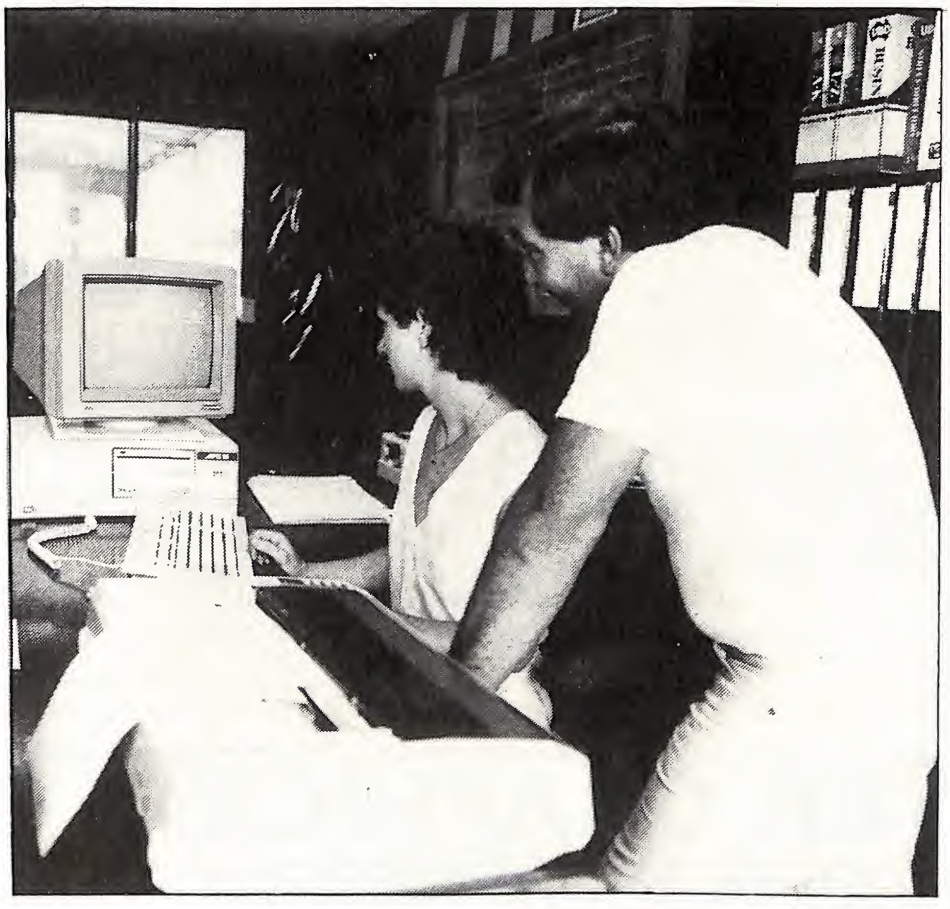

SELECTING A PC FOR BUSINESS

-The Real Issues

So many aspects have to be considered when deciding which personal computer to choose to fill a company's computing needs that it's hard for most purchasers to know where to look first. Les Bell summarises here the important details to check and the main criteria to apply.

THE SELECTION of a single personal computer is not a decision involving major risk, particularly if the individual making the selection will also be the user. Typical individuals in this situation include self-employed professionals such as consultants, architects, or engineers, and also department managers, small business proprietors and retailers.

Of these, perhaps the small business proprietor faces the largest risk in seeking to load the machine with the widest variety of applications, from standard accounting functions through to office automation and executive decision support. In placing operations critical to company cashflow – such as invoicing or inventory management – on the computer, he risks a greater loss in case of malfunction than say, the consultant who is using the PC as a word processor to replace an outside typing bureau.

However, in most of these cases, the selection decision can safely be based upon the old adage: **Select the software first, then choose the hardware to run it.**

Following this simple strategy, the purchaser can first select the appropriate software package to satisfy a particular requirement, then pick a machine to run it. Assuming the software is up to scratch, then the chances are that the entire system will be.

Volume Purchases

However, a different scenario faces the corporate EDP manager, who is responsible for volume purchases of personal computers for the whole organisation. In this case, he or she may face a myriad of often conflicting requirements. Many criteria are purely technical, but others are social and still others weigh upon the likely actions and future directions of companies in response to market activity. Trying to sort all this out can often seem like trying to score a perfect round in a fairground shooting gallery while riding the roller-coaster!

Some considerations override others. Perhaps the most significant of these relate to ergonomics and occupational health. This is a particularly important issue for government departments, but is likely to become increasingly important to the private sector.

Many aspects of occupational health do not, in fact, relate to equipment selection, but are to do with the way the equipment is set up in the workplace. For example, screens should always be installed at right angles to windows, so that strong sunlight is neither in the user's eyes nor shining over the shoulders to reduce screen contrast. Keyboards should be mounted at the correct height: this has less to do with the thickness of the keyboard than with the construction of the workstation or desk.

However, some aspects of equipment design do have an impact on the user's health, the major one of these being the display design. First, display size: the larger the better, within certain limits. A 30 cm (12 inch) display seems to be about best at the typical distance from eye to screen. The next attribute to check is character clarity. A simple test is to type the following characters on the machines being evaluated, as they are those most often confused:

OQ 2I CG DB HM BR BS UV B8 O0

The focus of colour displays is often not as good as monochrome monitors, so if a particular installation does not require a colour display, then monochrome is preferable. This is simply because colour displays have to put one red, one green and one blue phosphor spot where a monochrome can display three dots.

Check the focus and resolution on all kinds of displays, both in graphics and character modes. On monochrome displays, a choice of phosphors is often offered. Conventional wisdom is that amber is preferable, followed by green, then white. In discussion with experienced users, no particular preference emerged. However, a couple of points are worth mentioning.

With amber monitors particularly, there is a tendency for users to set the brightness too high so the characters bloom and actually become less readable. It also seems to be a particular problem with some amber screens that where they only have a contrast control and no brightness, it is impossible to achieve a satisfactory setting between having full-intensity video at the correct brightness and half-intensity video visible at all. With half-intensity visible, the full-intensity is too bright.

In these circumstances, a green screen may turn out to be less harmful, although finding an amber monitor with appropriate controls and training staff correctly in their use could overcome the problem. My own preference is for black characters on a white background, as this more closely resembles the foreground/background contrasts of the real world; it's the combination books and newspapers use, after all.

A tilt and swivel capability is also important, but most PC manufacturers do not provide this. Fortunately, independent

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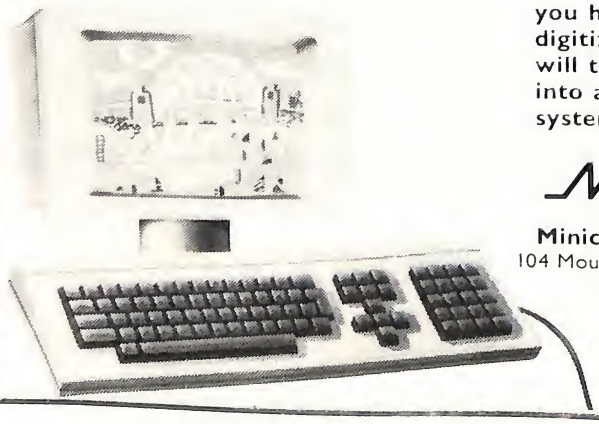

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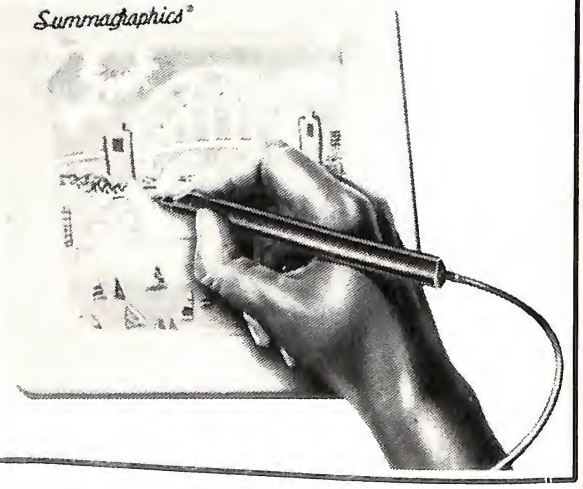

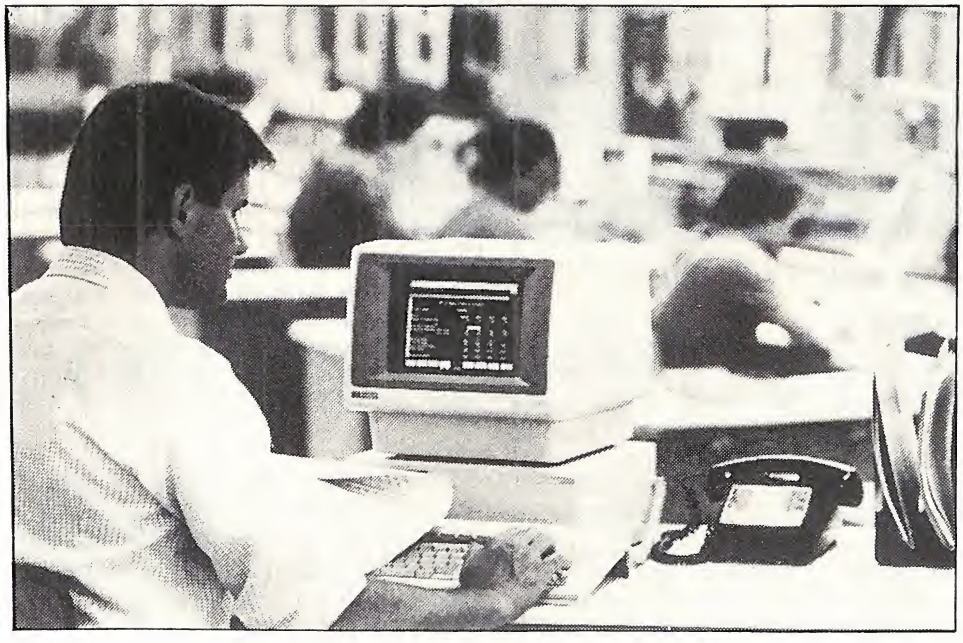

Placing operations critical to cashflow on the computer gives a greater risk of loss in case of malfunction than, say, using the PC as a word processor.

In larger companies the need might be for several terminal-like machines to link to a central data bank or processor. This HP Touchscreen, for example, is an integral part of an HP JIT (just in time) system. 'What if' simulations to determine the desired production plan are performed at the desk of the planner or scheduler, and communicated to an HP 3000 host system to automatically update the output rate per day of the factory.

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CHOOSING FOR BUSINESS

Sorting out all a company's PC requirements can often seem like trying to score a perfect round in a fairground shooting gallery while riding the roller-coaster ...

manufacturers can supply tilt and swivel bases and now angle arms which support the screen off the workstation surface.

Whatever screen is chosen, care must be taken to set it up the right way, so the brightness around and across the display is reasonably constant. If in doubt, use a light meter – even a 35 mm camera will do, if it has spot metering.

Keyboards

Keyboards are also important, although in this case the work environment – desk height, back support, and so on – is even more vital. A few questions should be asked, however. Is the keyboard low-profile? Is it detachable – it should be. For users who must also use other keyboard machines, the keyboard must conform to the standard ASCII layout; otherwise non-standard layouts can be tolerated.

The cursor key layout is important to spreadsheet and editor users. The ideal cursor layout is an inverted T shape, followed by a diamond layout. At the bottom of the list is the doubling up of cursor and numeric pads – they should be separate. For examples of well-designed keyboards, examine the DEC Rainbow and Wang PC keyboards.

For many users – particularly those doing volume data entry – the layout of the numeric pad is very important; does it have its own enter key? minus key? groups of zeros?

Programmable function keys may be important to you. Check that they can be easily programmed, and check whether additional keys (such as INS LINE, INS CHAR, and so on) can also be reprogrammed.

Footprints on the Desk

The system unit is also important from the ergonomic viewpoint. Does it have a small footprint? If not, can it be moved to a tower enclosure beside the desk? If it can, are the disk drives accessible without a back-breaking bend?

Some manufacturers have workstation enclosures available, which mount the PC system unit, display and keyboard with a printer at the back. These can be valuable for shared PCs, which have to be moved from place to place with minimum disruption.

Ideally, a PC should sit out of the way on the floor, with easily accessible disk drives, while the display mounts on an arm above the desk. The keyboard can then be pushed to the back of the desk when not required.

Test for Use

An examination of the technical and performance attributes of a PC can also reveal important distinctions. Do not simply use clock speed as a comparison of processor throughput. Memory can be cycling at a slower speed – plus, different processors perform instructions on different numbers of clock cycles.

Instead, benchmark the machine with a program which represents the actual conditions under which you will use the machine. In most cases, PCs will be used for memory-intensive spreadsheet and word processing applications.

However, if machines will be running database applications, or if they will be operating as file servers, then test the disk performance. Don't jump to conclusions; hard disks are not always faster than floppies, sixteen-bit processors are not always faster than eight and networks don't always network.

Support is Vital

In the long run, other considerations will probably be more important than speed: for example, vendor support, whether the vendor be a manufacturer, distributor or dealer. You may not have experience with the vendor, but it's worth asking around to find out what you can.

First, training. If you are installing a number of personal computers in an organisation, what training will the vendor provide in operating and 'caring for' the machines? People don't automatically know what to do with floppy disks, and don't know about important procedures like backing up.

Maintenance is also important. Expect trouble from day one; that's just the nature of electronic components – they tend

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AUSTRALIAN HARDWARE DIVISION
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...other computers cringe

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Reliability is often thought of in terms of machine breakdowns. Nowadays, the big problem isn't with breakdowns it's with hangups – when your machine turns out to be incompatible with your software. This is an enormous, widespread problem.

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Then they customized all their CP/M products to run perfectly on the PortaPak – products like dBASE II, SuperCalc, all the major languages, accounting systems, etc. Most importantly, they stake their reputation that all these products will work without hitches. No other computer in Australia can offer this total software support.

As for electrical and mechanical reliability, look inside a PortaPak. There's a striking difference. The PortaPak is completely modular. We didn't scrimp by putting all the circuits on one board. We use *three*. Servicing is simpler, quicker and cheaper. It's why the leading national computer service company, TCG Pty Ltd, is pleased to offer a 12 month service contract on PortaPak in all capital cities.

Take an extra close look at the Canon disk drives. If Rolls-Royce built computers, they'd use Canon drives. See the massive head protection shield? Hear the way the heads lock away every time they deselect? The designers had an unusual attitude to reliability – fanatical.

Now carry out some speed tests. On a standard benchmark test using BASIC routines*, the timings are: PortaPak 12.9 seconds, IBM PC 16.4 seconds, NEC APC 19.7 seconds and Sirius 16.4 seconds. Using a standard dBASE II routine**, the timings are: PortaPak 8 minutes 11 seconds, IBM PC 11m 52s, Sirius 17m 9s and NEC APC 19m 16s.

The expensive imports really cringe at this because they make so much of being "16-bit" machines. PortaPak is an 8-bit machine and proud of it. Not only is an 8-bit machine inherently better suited to jobs like word processing, accounting, spreadsheets, etc, but the 6MHz clock rate ensures it can run rings around the others even in complicated mathematical tasks.

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- Universal terminal emulation lets your PortaPak mimic the screen handling of other computers and run the programs installed for them. Your PortaPak can act as a terminal for any computer you care to name.
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*See Australian Personal Computer, Feb., 1984.
**See Australian Micro Computerworld, Nov., 1983.

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to fail early in their lives. Expect to have problems with getting things set up, too.

An important point to bear in mind here is that even if you specify a standard IBM PC, a significant part of the machine will be non-IBM, since the dealer will often replace IBM parts with less expensive substitutes: typically, the display, second disk drive, memory or multi-function card and possibly other components will be from third parties. Expect compatibility problems, and don't be surprised when the supplier can't fix them.

How about upgrades? It's nice to know that your supplier will notify you when upgrades are available, and will supply them free or for a nominal or appropriate cost. Some are just never heard from again.

Availability of technical information is important. Somebody in your organisation is going to want to drive an odd-ball plotter, or a camera or other graphics device which has its own strange protocol for RS232C communications. Sometimes suppliers just don't want to know, but with a decent technical manual you can generally sort it out. Notice that IBM, for example, publishes a complete and comprehensive technical manual for its PC.

Another important point is the manufacturer's attitude to third-party products. Again, IBM encourages development of unusual boards, interfaces and software for its PC, while some other manufacturers have discouraged it as an infringement of proprietary information. Sales histories show that these companies are the losers.

Finally, support for phased-out products: PCs have a shorter and shorter lifecycle, but they don't magically stop working just because there's a newer model on the market. In many cases, although the manufacturer may cease support, user groups and specialist support companies may continue to provide a high level of support (sometimes higher than the original manufacturer!).

Other factors obviously enter into any purchase decision: the 'feel' of the product, its quality of construction, and its appearance are all important.

The key factors today are ergonomics and support issues ... the technical aspects are less important.

However, the key factors today are ergonomics and support issues, and the technical aspects are less important. It is obvious from even a brief examination of the market that most users do not want the highest-performance machines, but are happy to settle for a machine that is comfortable to use, of medium complexity, has good support and offers them a selection of software.

This article is an extract from a paper presented by Les Bell at the PC85 Conference. □

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BY NORMAN KEMP

VIATEL GRAPEVINE

FOR THOSE whose pockets can stand the expense, a shoal of new videotex products is expected to be launched over the next couple of months – assuming Telecom's Viatel service takes off as quickly as is hoped. Although several companies have standard terminals and software on the Australian market, most are preparing to announce second-generation Prestel-type gear which has been used and proven on overseas services. This covers not only video monitors and TV adaptors but also keyboards, printers and communications software, and the cue for their release will depend on the early reaction that subscribers give to the new service in Australia.

As public access Viatel is being directed for a year or more almost exclusively at the commercial and financial user base – wide use of home videotex is still regarded as being generally a couple of years away, although some banks and consumer goods suppliers are putting trading facilities on the database – price is not considered a limiting factor to sales.

Initially some of the firms supplying videotex products will be advertising and promoting their products through the interactive electronic mail resources of Viatel, giving the user an opportunity to ask for further details or make a purchase with an approved credit card. This facility of electronic shopping through a user response facility will be one of the features distinguishing the Australian service from the original British Prestel, on which the user can access information on a screen, but not communicate with the information service provider. Among the products to tempt the impulse buyer will be personal computers and desktop terminals.

Owners of personal computers with colour screens can plug in a modem with 1200/75 baud capability to access Viatel information services using much the same procedure as bulletin boards, but for many first-time users a Viatel unit with a nine or 14-inch (23 or 36 cm) screen and a keyboard will have to be purchased, leased or rented from an approved Telecom supplier. A typical current device in the lower price bracket is a British-made Model 1616 Tandata viewdata controller, available from Sydney supplier Visionhire for $565. It can be attached to an RGB (red, green, blue) screen, video monitor or a television set with VHF, and has a battery-powered non-volatile memory with a capacity of 13 pages. A keyboard with the colour and graphics features suitable for editing purposes costs from $400 to $600.

With the launch of Telecom's public access Viatel system, videotex looks as if it might finally take off in Australia (see our report in the March issue). Viatel is intended for both business and domestic use, and may be accessed through your specially adapted TV set, your computer, or using a dedicated Viatel terminal. Since the facilities available through Viatel will be expanding weekly as the service becomes more well-known and widely used, 'Your Computer' will be running a column devoted to Viatel in each issue, to keep you up-to-date with developments and new services.

For those who want a more advanced terminal, Visionhire is marketing for $1900 a Philips 14-inch (36 cm) terminal and screen with an auto-acquisition feature enabling the device to retrieve 13 pages from the database, store them and automatically disconnect. In practice, the user can take off a response frame, type in details offline – a saving in editing time – and then return it to the database. This facility has been designed to facilitate travel reservations, but can be used in other applications such as ordering goods.

Later in 1985, Visionhire will be importing another Tandata product, the TD1800, which will have a dual-purpose switch between Prestel and ASCII protocols. Prestel differs from many other databases in not using ASCII formats, and while Viatel can be accessed, for example, through Austpac, a Viatel user at this time cannot move in the opposite direction without specially modified equipment.

Sony Provides Products

Visionhire also markets another well-known brand, Sony, which actually makes its videotext products in the United Kingdom at its electronics factory in Bridgeport, Wales. The current KTX9000 nine-inch (23 cm) screen model with keyboard and 14 pages of memory has a key page facility which enables the user to keep track of regularly needed pages in the database. This facility can be used to find a page in the directory automatically. The KTX9000 with all features and Prestel keyboard is priced at $1434, or, as with the other leading terminals, may be rented for about $80 a month.

Sony is working on a later model with a 14-inch (36 cm) screen and 28 pages of memory, which will sell for around $1758. It has the ability to work through a TV screen in conjunction with a laser disk. Aimed primarily at travel or real estate applications or corporate training courses, it enables the user to take information from the database and superimpose it on a picture retrieved on the screen from the disk. Specific programs can be taped and sent to the US, where they are 'stamped' onto a laser disk for other applications – but at this stage, disk contents, once manufactured, cannot be changed.

Also coming in the Sony range is a new large-screen model, and an adaptor to work with a variety of monitors. A heat-sensitive printer which can be attached to the KTX9000 will also be available soon at a price of $870. Keyboards to be added to the standard range include a model of similar size to the IBM unit, and another which will enable pages to be edited off ▷

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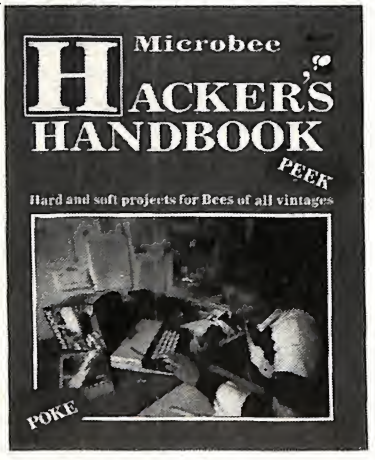

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VIATEL GRAPEVINE

line – a saving on communications costs – and stored in the terminal memory until it is ready to be downloaded.

Fathoming the Mysteries

To assist potential and new users to fathom the mysteries of Viatel, and particularly service providers who will be responsible for putting information on the databases, there are now several specialist consultants in the field.

Paul Budde, of Sydney, whose company Paul Budde Communication Pty Limited has been responsible for setting up the Commonwealth Bank home banking system, the travel industry database AFTEL and is now working on the Telecom Yellow Pages directory, said he believed it would take a provider about two years to become wholly accustomed to the potential of the videotex service.

"Videotex at the moment is a separate industry, but eventually through user demand it will become an integrated part of communications," he said. "It breaks the nexus of communications only through computers. It is not a medium to be used for extensive background information, but for quick passing of messages or keeping in touch with developments, and it has the potential to become very important in many areas outside business, such as education and research."

Paul believes there will be an increasing growth in consultancy services to assist providers in setting up applications, including marketing strategies, database management training, interactive keyboard familiarisation, graphics design in colour and workshop sessions. It could take large organisations up to two years before they understand the systems thoroughly and can operate without external advice, he added. For first-time users with little experience, the average rate for consultancy is about $60 an hour.

The Computerphone

According to Paul Budde, another of Telecom's communications innovations, the Computerphone, will fit nicely into the Viatel network. Computerphone as it is known in Australia was originally a British-made device called 'One-Per-Desk', developed by UK computer companies ICL and Sinclair. Like Sinclair's QL computer, it has four software packages in ROM: Quill, for word processing; Abacus, a spreadsheet; Easel business graphics; and the Archive database manager. Computerphone is based on a Motorola 68000 microprocessor, three uncommitted logic arrays and an additional Intel 8051 dedicated to supporting intelligent communications functions. A separate voice synthesis processor is incorporated.

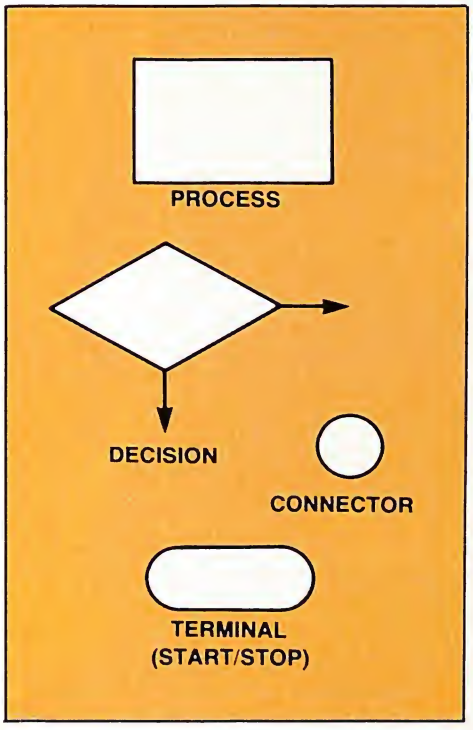
Weighing less than eight kilograms, with a choice of 12-inch (30 cm) monochrome or 14-inch (36 cm) colour monitor and control unit, it will be priced from $2900 to $4500, depending on configuration. The control unit comprises a telephone handset, full-sized professional keyboard with editing functions for Viatel, separate numeric/telephony function pad, two microdrives, processor board, telephone module and integral modem, printer interface and the ROM memory applications. It has almost 500 Kbytes of storage, with the architecture of the system containing 352 Kbytes of ROM for the operating systems and applications software, and 128 Kbytes of dynamic RAM for screen memory and user data. The twin Sinclair microdrive cartridges each contain up to 100 Kbytes formatted capacity.

Computerphone is a multi-tasking machine, which means it can run a number of tasks or applications concurrently. It connects directly to a standard telephone socket to give access to analogue network services for local, national or international communication. The control unit can supervise a number of functions, among them diary and note-keeping, word processing, a database management system, message passing, access to Viatel or private videotex systems, accessing mainframe computers, calculating and spreadsheeting, business graphics and outgoing telexes through Telememo.

With Computerphone, Telecom Australia is spearheading an intensive drive into the Australian communications market through videotex channels. Other similar types of equipment are available, but Telecom claims that none has features so advanced at combining the regular functions of both computer and telephone facilities.

Some sections of the communications industry are aggrieved that Telecom appears to be competing against private companies, and has an advantage over them in its monopolistic ownership of the public lines. But this factor may not be so important in due course, provided Telecom permits competition for the services, which will inevitably lead to improvement in the communications products and benefits which will be passed on to business and the community as a whole. □

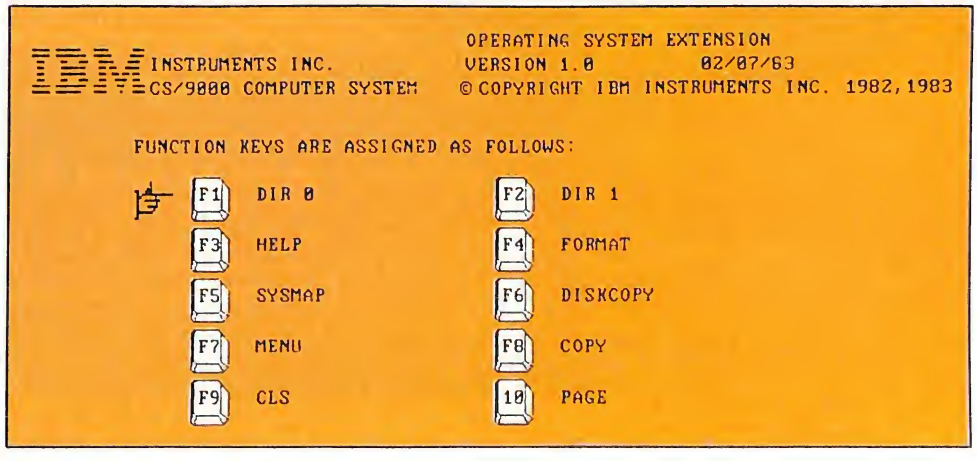
Instruction Set



Structured Programming ____ 133
As our honourable teacher says, "Who in their right mind would ever admit to unstructured programming?" Well, you won't have to feel guilty anymore if you follow this new instructional series – and you'll experience the benefits of programs that are easy to understand, easy to modify, easy to run ...
By Phil Grouse

dBest of dBase – Part XII ____ 143
You've got the programming. You've got the style. But colleagues and neighbours are tiring of your frustrated screams; "Faster, faster, faster ..." Let Lickety-split Les learn you a little lesson.
By Les Bell

BASICs Ain't Basic – Part II ____ 151
We continue our short series on unusual versions of the BASIC Language. This time our language reporter at large looks at Silicon Valley Software BASIC as implemented on the IBM 9000 computer system.
By Dom Swinkels



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Jan-Mar
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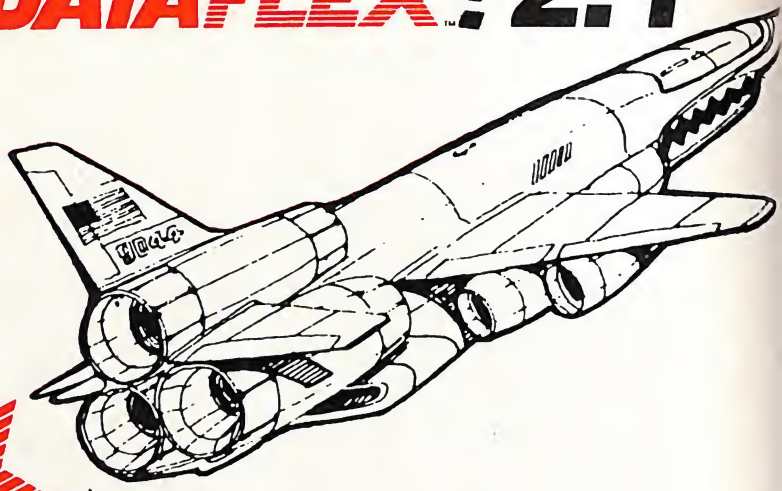

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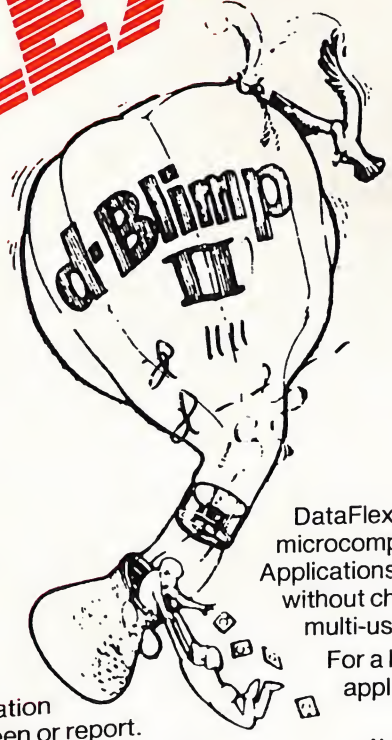

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HOW TO WRITE A STRUCTURED PROGRAM

Phil Grouse, author of many text books on computer programming (and a member of our Computer of the Year Awards committee) starts a new tutorial series on structured programming.

SOME YEARS AGO, while delivering a professional seminar for practising programmers, I put the question "How many of you use the techniques of structured programming in your normal daily work?" Nearly all of them said they did. After all, it had just become the 'In Thing'. And who in their right mind would ever admit to 'unstructured' programming? That would be tantamount to admitting to unstructured thinking. Following up on this totally predictable response I asked one of them what he meant by the term 'structured programming'. Here are the essentials of his response.

Structured programming means:

- ☐ Planning your logic before writing the code.
- ☐ Putting in lots of comments.
- ☐ Desk checking the logic before and after coding.
- ☐ Using a language designed for structured programming.
- ☐ Programming by step-by-step refinement.
- ☐ Breaking programs up into small modules.
- ☐ Using formal methods for proving module correctness.
- ☐ Avoiding the GOTO statement.

Using meaningful variables.

Most of the other seminar members made similar points. In a way, all were right, and all were wrong. Their mistake was to confuse the concepts of 'good programming practice' with 'structured programming'.

Good programming practices include the abovementioned points, and a good many more. We'll be writing about those as well in later articles. But none of my students really knew what is meant by structured programming. None, that is, apart from a student of Computer Science at Sydney University who defined it this way:

Structured programming restricts all transfers of control to a 'preferred set' of control constructs. It may also require the minimisation of the number of global variables used in the program."

What a mouthful! If it amounts to restrictive practices, then what's so good about it? And what on earth is a 'global variable'?

This series of articles is presented to help you to write *good programs*. Programs that do what they are supposed to do. Programs that make sense to you a year later. Programs which don't drive you batty when you have to modify them. Programs which work first time around. Programs in which you can feel confident, and of which you can be justly proud.

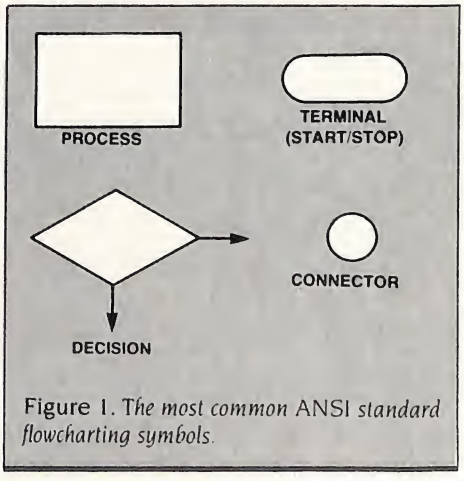

Figure 1. *The most common* ANSI *standard flowcharting symbols.*

As I shall try to convince you, the practices of structured programming can take you a long way towards 'The Program of Your Dreams'.

To reach this point it will require a little patience on both our parts. If you are a programmer already, you may find yourself disagreeing with my recommendations because they may challenge your established professional approach. Either way, I ask you to keep an open mind throughout this series, to be prepared to follow through the examples, and to carry over what is learned into your programming – private or professional.

I've been using these techniques for years now. As a result, I find that programming is a real delight rather than a chore.

First, a word about what structured programming is *not* about. It's not about any particular programming language. If you're a BASIC buff, then fine. If your thing is FORTRAN or Pascal, or C or IBM Assembler, no matter. You can write structured programs in any computer language, no matter what its level, or whether it's been designed for structured programming.

Language only becomes important when making the transition between your 'logic design' and the final code. And that transition is usually so simple, why even a computer can do it for you.

The emphasis in this series will be on logic design. Plenty of complete programs will also be given to demonstrate how logic designs can be translated into programs in a variety of languages, so you won't be left wondering.

Logic Design

A logic design is like a plan for a building. The final program is like the building itself. Imagine how stupid it would be if, ▷

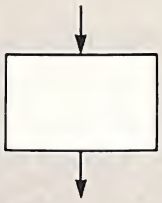

Figure 2. *The 'sequence' block represents a simple operation, or a complete program. Like all the other control constructs, it has just one entry point and one exit point. It is the fundamental building block of the program designer.*

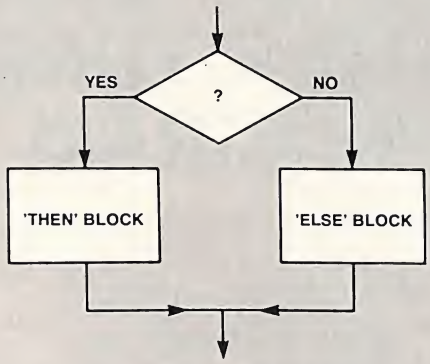

Figure 3. *The* IF-THEN-ELSE *block also has just one entry and one exit. A question is asked in the decision box. If the answer is* YES, *then control is 'transferred' to the sequence box on the left (sometimes called the* THEN *block). If the answer is* NO, *the sequence block on the right (the* ELSE *block) is executed.*

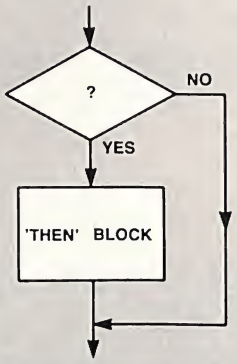

Figure 4. *The* IF-THEN *block is just a special case of the* IF-THEN-ELSE *in which the* ELSE *block is absent. In other words, the* THEN *block is executed if the answer is* YES, *but nothing is done if the answer is* NO.

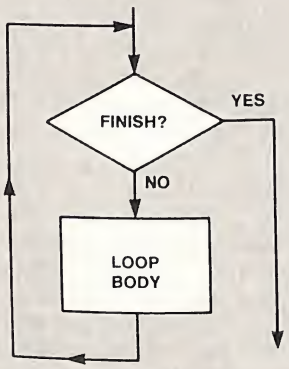

Figure 5. *This is the* WHILE *block. It is a primitive looping construct in which a test is made just before entering the loop as to whether to perform the sequence block (which is called the 'body of the loop'). In some cases the body of the loop might never be performed at all.*

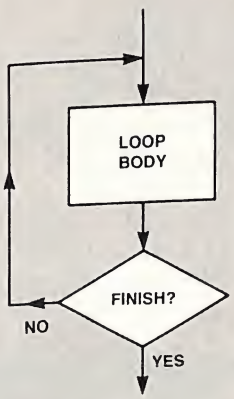

Figure 6. *The* UNTIL *block is the only other looping construct allowed in this scheme. Unlike the* WHILE *block, its test is performed after the body of the loop has been performed. The test asks 'Is it time to quit this loop?' Because of the position of the test, the loop body must be performed at least once.*

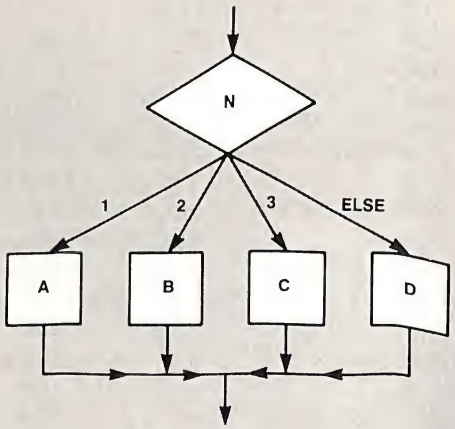

Figure 7. *This is the* CASE *block in the form suggested by its authors. There is a sequence block for each possible value of the expression* N *shown in the decision diamond. For example, if* N *is* 3, *then the block marked* C *will be executed. Block* D *is executed only where no sequence block has been specified for a particular case of* N.

having decided to build yourself a house, you simply began by ordering a pile of bricks, mortar, timber, nails and paint – and then began putting it all together with a "Here's a good place for the lounge-room," and, "Let's put the kitchen over here." I'm sorry. Maybe you did build your house that way! And maybe you're proud of it. I once had a programmer working for me (for a short while) who worked just like that. He was very intelligent, and lightning fast. You could ask him to write a program to do such-and-such, and he'd sit down at the terminal and start writing code straightaway. And the darn thing would work! He'd crow over it for a while, then have a fiddle with it to "make it better". This rarely worked. More often than not, he'd have to scrap what he'd done and start all over again. Nobody else could read his programs. They were crammed with cunning and subtleties to make them fast and compact. But the subtleties were often his undoing. After a few weeks even he was baffled by his brilliance. No. Structured programming is not a matter of being subtle and cunning; it's a matter of writing programs that work, and work, and work ...

When creating a plan for a program or a house you have a choice of two approaches. Draw a diagram (the graphical approach), or write a document (the textual approach). Sometimes you'll use both methods, and we'll be looking at each technique. The remainder of this article will be concerned with flowcharts, and how they can be used in the design of structured programs.

Flowcharts

The flowchart is the time-honoured method used by a majority of programmers for designing and specifying program logic.

I have a collection of plastic flowcharting templates dating from the late Fifties. They feature cut-out shapes of all types and sizes. In those days there was little agreement between computer manufacturers over the 'right' shapes to use. Each did what what right in his own eyes. This state of affairs lasted until 1963 when the American Standards Association (ASA) Committee on Computers and Information Processing (now known as ANSI) proposed a set of standard symbols. These symbols were revised in 1966 and are now widely accepted. Figure 1 shows some of the more commonly used symbols and their meanings.

Logic flowcharts are 'directed graphs'. Each flowchart representing a process has a single entry point (where control starts) and, usually, a single exit point (where the program stops). The flowchart consists of a set of rectangular boxes representing 'things to do' (processes), diamond-shaped boxes representing decisions, and a bunch of lines hooking them all together like one-way streets on a road map. The order in which the computer performs the various processes in the boxes depends on what happens in the decision boxes. Each decision box is like a fork in the road; you can go either to the left or to the right. The direction to take is governed by a test which is specified inside the box. Examples might be 'Is N zero?', or 'Have we printed the last line of this page?', and so on. A really complex flowchart can be as nightmarish as a road map of Melbourne to a Sydneysider.

All of which reminds me of an incident in the mid-Seventies when I was involved with a company building special-purpose minicomputers. This particular organisation had a contract with a large government department for huge numbers of these machines. The minicomputer had been designed by two engineers, who also turned their hand to programming. The program they developed made the minicomputer into a special-purpose machine. It did just what the customers wanted. That is, until the customer changed his mind about what the machine should do. The obliging staff of the company made the required changes to the program, suitably modifying the code and flowcharts as required. As time went on, the situation became predictably messy. The product worked, but each new modification became more and more difficult to achieve.

After a few years, the program maintenance team simply refused to touch the code again. They declared the code 'terminal' – rather ironic, since the application was for multiple terminals! The programmers would describe the flowcharts as 'spaghetti code'. Wiggly lines all over! The problem with flowcharts is that they let you do anything. They are just a little too powerful. With no discipline, flowcharts can become real disaster areas.

Despite the popularity of the flowchart, it's a method that leaves a lot to be desired. In particular, flowcharts are really of value only in 'external' documentation, since it's almost impossible to put flowcharts into a program listing as comments. Second, updating a flowchart is a real pain. As a result, few programmers bother. Finally, because of their generality, flowcharts do not encourage the use of structured programming techniques.

On the other hand, clear, well-defined flowcharts can show exactly what the program is to do, and how it should do it. They can be easy to read, and are undoubtedly the most popular form of graphical logic representation.

Taming the Flowchart

To avoid the horrors of spaghetti code, a series of proposals was made in 1966 to tame the flowchart (Bohm and Jacopini, 1966). Essentially, the idea was to identify a small number of simple flowchart 'constructs'. Each construct would have only one entry point, and one exit point. There would be just enough such constructs to permit the writing of any kind of program. These basic control structures are shown in Figures 2 to 7. They have since become the key elements in structured programming.

Because each of these 'constructs' or 'structures' has just one entry and one exit point, each one is in itself a sequence block. In other words, complete programs may be built up by replacing various sequence blocks with other (more complex) structures.

A Program Example

For example, a complete program might be represented by a single sequence block called 'PrintFile', as shown in Figure 8. Let's say we want this program to read and print a file (on a line-by-line basis). Like most programs, it can be broken down into a prologue (the bit you do first), the middle (where the real work is done), and an epilogue (where you fix things up

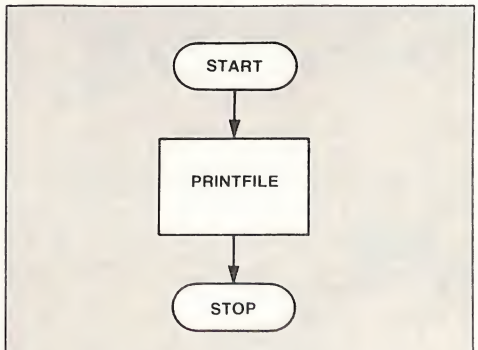

Figure 8. *The simplest representation for a program to print a file.*

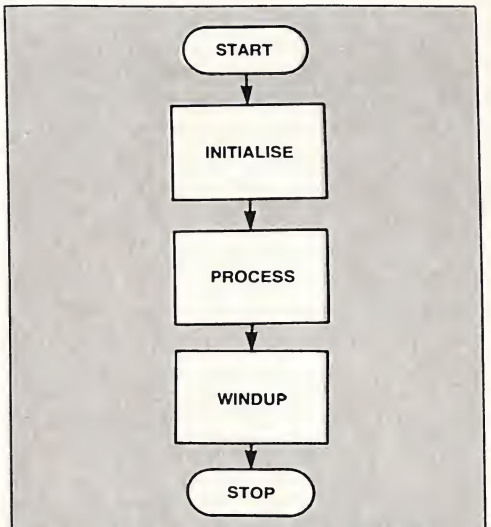

Figure 9. *The initial expansion of PrintFile into three basic modules.*

in readiness to stop the operation). Such a breakdown is shown in Figure 9. Figure 9 is the logical first step in expanding the primitive expression of the program shown in Figure 8.

Now let's think a bit about what we should be doing in the block called 'Initialise'. How about its putting up some instructions for the user of the program? It should also ask for the name of the file and open it.

But what happens if the computer finds there is no such file? Well, you have a couple of options. Initialise can 'stay in a loop' until (there's that word) the user supplies the name of a file which really is on the disk. Alternatively, the program could simply issue a message telling the user there is no such file, then stop. The second approach is the most common, so let's do that. Straightaway we've abandoned the simple breakdown shown in Figure 9. Instead we have the program in Figure 10. 'Process' and 'WindUp' have been relegated to the left leg of the IF-THEN-ELSE block which tests for the existence of the required file.

Now consider the block labelled 'Process'. This is the classic 'data processing loop'. Here we are trying to read lines from a file. In the good old days it would have been reading cards from a card reader – one at a time.

Figure 11 shows the 'most logical' flowchart for 'Process'. Remember that when reading cards, records, or lines from a file, unless you know exactly how many are to be read, you must keep on reading (and

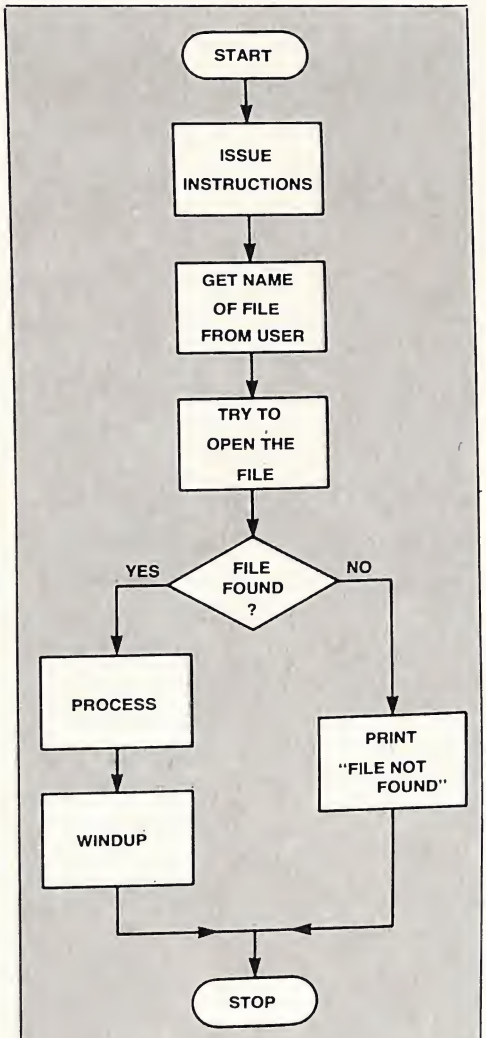

Figure 10. *A more detailed solution for PrintFile, allowing for a possible failure during Initialise. The structure follows the principles of Bohm and Jacopini. It is a sequence block followed by an* IF-THEN-ELSE *construct. The* THEN *unit consists of two sequence blocks. The program itself still has one entry and one exit point.*

printing) until an attempt to read results in failure. In our case that would happen if we attempted to read a line from the file after the very last line had been read. This is called the 'end of file' condition. The exact details of how you test for this condition vary widely according to the programming language you are using, but the principle remains the same. Now look carefully at Figure 11. Is it 'structured'?

Though Figure 11 depicts a controlled loop, it can't be classified either as a WHILE or an UNTIL block. Its test is smack in the middle. Now that doesn't mean it won't work. It should, and it's nice and concise. But it's not 'structured'. "So what?" I hear. Well, thereby hangs a whole ballpark of argument. We'll come back to that later.

For now, let's assume we want to do the same thing as shown in Figure 11, but we want it to be 'structured' (for better or for worse). To do that, we must put the loop test either at the beginning (WHILE) or at the end (UNTIL). If we put the test at the beginning, we're in trouble because you can't test for failure until an actual read operation has been performed; and that read operation is in the body of the loop. So how about putting it at the end?

If we put the test at the end of the loop (as in Figure 12) we will have generated a nice-looking UNTIL block – nice, all except for a nasty bug. Can you spot it?

The key is that a 'read operation' is really an *attempt* to read. That attempt will fail when you try to read beyond the end of the file. We rely on that 'failure' to tell us when to stop the loop. Unfortunately, in this case, after the unsuccessful read attempt, the program will print junk before performing the loop termination test. △

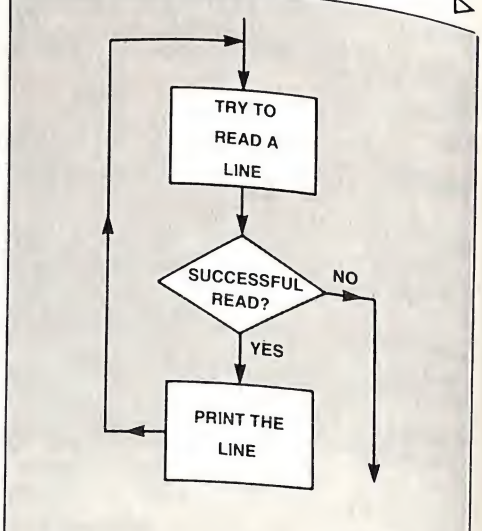

Figure 11. *An initial solution for the 'Process' block. The loop test is being performed in the middle of the loop body!*

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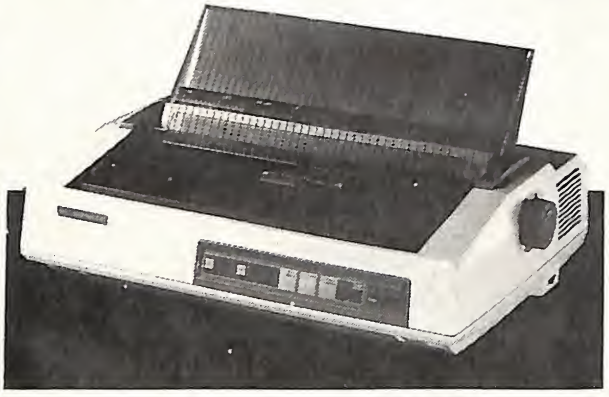

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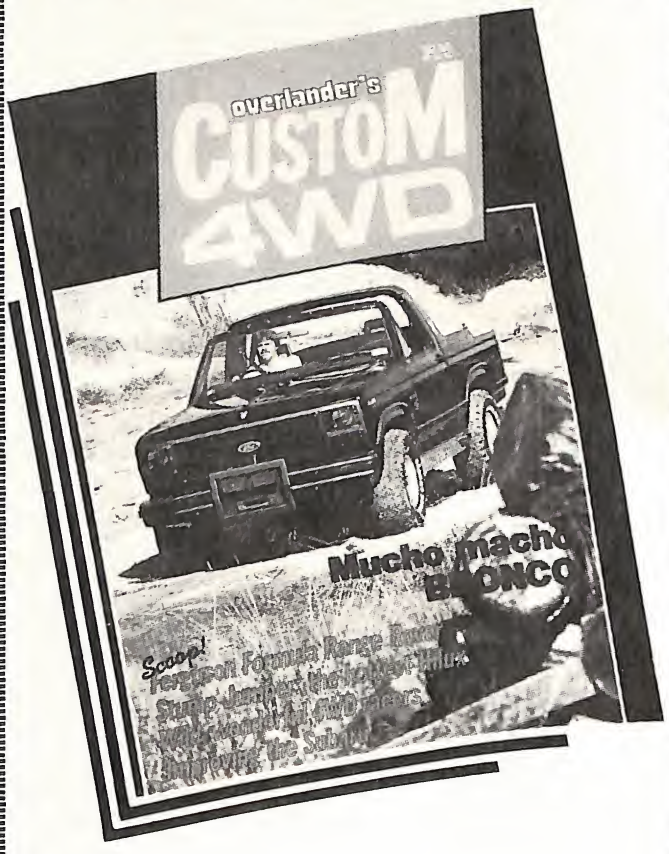

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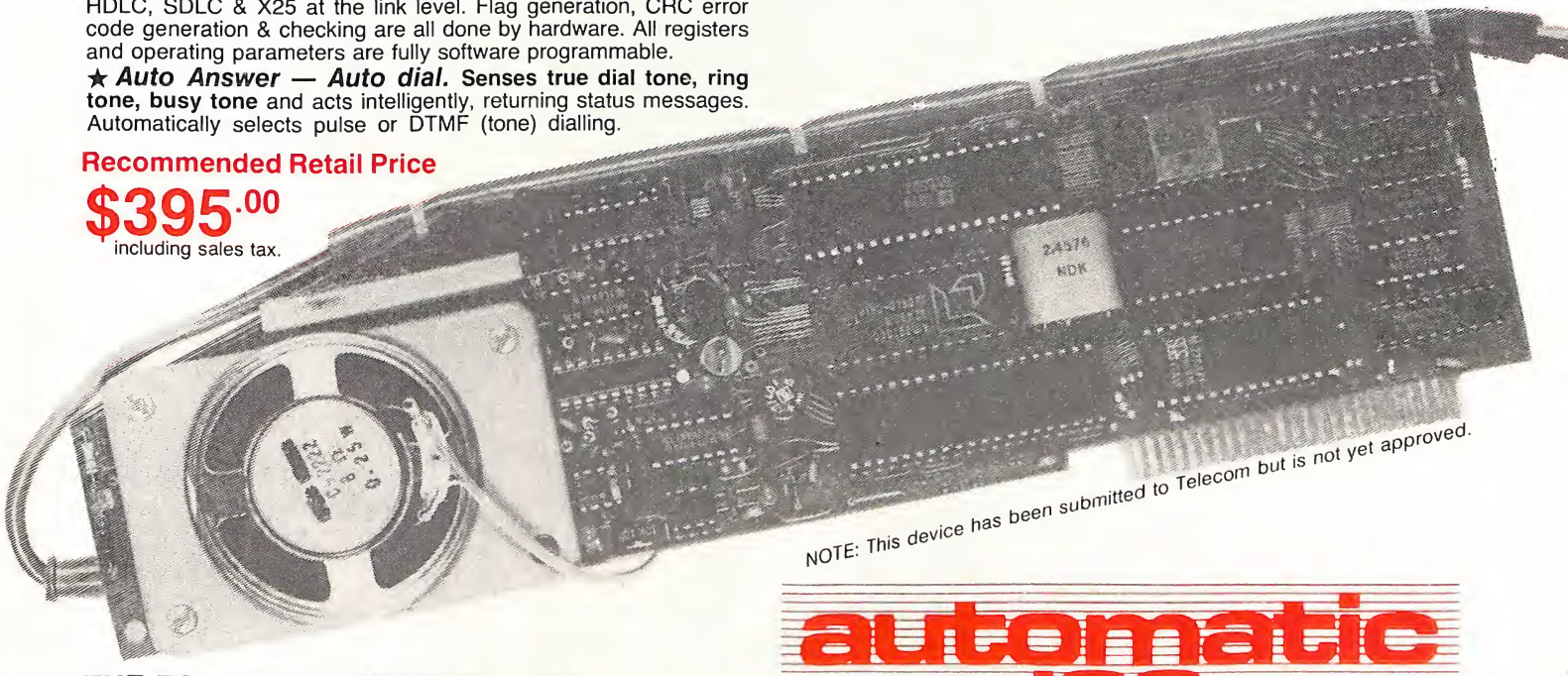

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In most cases the junk will consist of the data for the last line, so you wind up with two copies of the last line instead of just one.

The most popular structured solution to this dilemma is the program shown in Figure 13. It turns the processing loop into a WHILE block preceded by a sequence block which tries to read the first line (only). I have heard this program described as a 'data processing pump'. Round and round goes the wheel. On each stroke a new heap of data is sucked up (a line in our case) and squirted out (onto our screen or printer). The lone 'read the first line' block is called 'priming the pump'. Putting the loop test at the start of the loop is now just fine, because of the pump priming 'read the first line'.

But note the penalty paid for making the program structured; we now have two 'read' operations instead of just one. This means the program will be bigger (but probably not slower).

So why bother with Bohm and Jacopini's control structures?

To Structure or not to Structure?

That's a question which has been hotly debated for years. It's a real can of worms. Many authors have complained that the techniques of structured programming lead to larger and slower programs. Others point out that the advantages of 'clean code' far outweigh the disadvantages. In the days when a 'big' machine had just 64 Kbytes of memory, size and speed were matters of importance. As processor speed multiplies annually, and as memory keeps dropping in price, the disadvantages are being continually minimised.

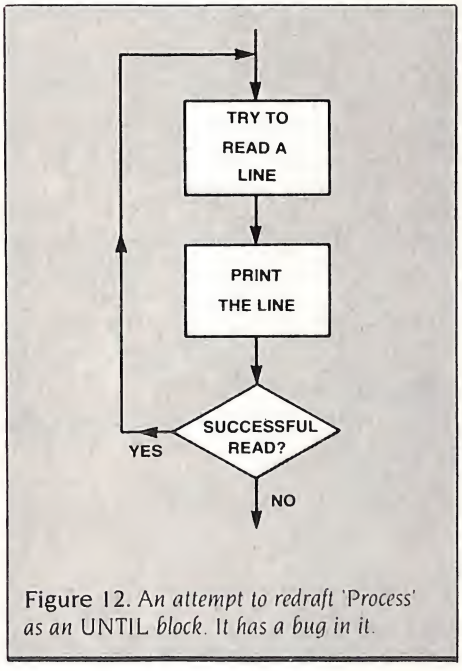

Figure 12. *An attempt to redraft 'Process' as an* UNTIL *block. It has a bug in it.*

But what are the real advantages?

The greatest advantage is that it helps to get your thinking straight when trying to design a nasty piece of program logic. You begin to think in terms of WHILE, UNTIL and IF-THEN-ELSE. By sticking to those structures you can refine your logic in neat little chunks (modules), each of which can be tackled in the same way as your original 'big picture'. Another advantage is that you can more easily 'desk check' your logic before blundering it into real code. Anyone involved in maintenance programming (modifying other people's programs) greatly prefers it if those programs are structured.

The term 'structured programming' was coined by Ed Djikstra (1969). Both he and his colleagues intended the term to refer to a particular style of programming. Since then, there have been many attempts to give structured programming a rigorous definition, and it has always been the target of debate.

Most 'practical' programmers are happy with a less than formal approach to the subject – more in Djikstra's spirit. There's no law which says you can't use the flowchart of Figure 11, or that you can't use the GOTO statement. It's all a question of personal choice. The exception might be the professional programmer who must toe the line established by his employer.

Perhaps the most hotly debated concept has been Djikstra's notion of 'avoiding the GOTO statement'. In many programming languages (BASIC in particular), it's almost impossible to write a meaningful program without using GOTO (or whatever passes as its equivalent). But this is not what guru Djikstra meant. The real point is that all transfers of control within a program's logic should be performed by the kind of structures suggested by Bohm and Jacopini. It may be necessary in some languages to implement those structures using GOTOs (as we shall see in later articles).

To Summarise

Structured programming is really a programming style. Its users frequently shout its praises, and those who don't use it regularly decry it. As for myself (and I've been programming professionally now since 1954), I think it's the greatest thing since sliced bread. Although I must confess to using the occasional GOTO when I'm just too lazy to code 'correctly'.

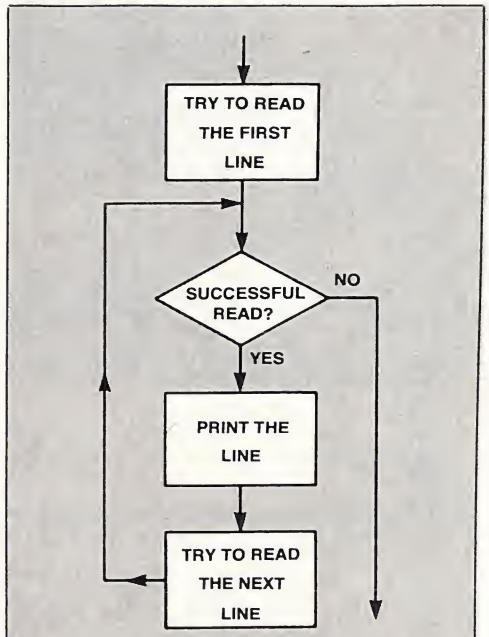

Figure 13. *A structured solution for 'Process'. The first read operation 'primes' the 'pump' (the* WHILE *block).*

The real benefits of structured programming lie in the help it gives when developing difficult logic, and when modifying an old (structured) program.

Yes, it does carry a penalty. It can make your program bigger, and possibly slower. But it takes you out of the crazy business of being stuck in a loop yourself while you mess around with a program, test it, mess around, test, mess ...

Using the techniques described in this series, you can look forward to the time when you may confidently expect the programs you write to work first time. And they should. After all, would an engineer designing a bridge expect it to fail the first time? The next article in this series will look at alternatives to flowcharts. Till then, good programming!

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☐ C. Bohm and G. Jacopini, 'Flow Diagrams, Turing Machines and Languages with only Two Formation Rules', in *Communications of the* ACM, Volume 9, No 5, May 1966, pp 366-71.

☐ E.W. Djikstra, *Notes on Structured Programming*, Technological University, Eindhoven 1969 ☐

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GETTING dBEST FROM dBASE

Part 12

After last month's diversion into dBase programming style, we'll now look at the major temptation for abandoning it: getting speed. While dBase is slow (compared to what is technically feasible), there's no need to tolerate lousy performance when there are a range of techniques which will speed things up considerably.

PART OF THE problem with dBase is the fact that it uses disk files extensively. This is a hangover from the program's early days, when it first saw light as a mainframe database on a Univac system. On a mainframe, life revolves around disks, which is fair enough when you have high-speed peripheral channels with their own processors and high-speed I/O to thundering great disk packs. On microcomputers, however, disks are inevitably too slow.

The result of this is that a lot of the time while you're running a dBase program, the dBase interpreter isn't actually running; it's waiting for the operating system to give it some data from the disk drive. Data, in this context, means not just sections of a database file, but also any other kind of file – index, program, screen format, report format or memory file.

The place to start looking for ways to improve dBase operation, therefore, is with the disk files, and there are several very simple ways of doing this. You may recall that one of the maxims of good programming style is to get it right, then make it faster, and while making it faster, to keep it right. We will therefore concentrate on techniques for optimisation which do not involve tinkering with the source code, therefore minimising the chances of screwing up a working program.

Not Many Files

Technique number one is the only one which must be applied during the design phase of the system – all the others can be applied after the fact. It's simply this: rather than spreading the database over several database files, put everything into as few files as possible, even though this might mean repeating redundant information. For example, a typical technique is to place customer order data in one database file, and the customer address details in another. This is slow, because the system has to switch between two databases.

If speed is your goal, then a better technique is to put both the order details and the address details into a single file. When processing an order, the address information is then instantly accessible. Of course, the penalty for this is that many orders will have the same address details, thus wasting disk space.

This technique is particularly important when your application can be reduced from three or four database files to two or less. This is because dBase II can only manage two open files at one time, so your program has to spend a lot of time saving the current location in a file, then USEing another, performing some processing, USEing the original and doing a GOTO to get back to the place it left off. This is very time-consuming, and it's worth contemplating another system, like dBase III, if you're concerned about speed with this kind of program.

I'll discuss database design in more detail in the next article, when this technique of database normalisation, as it is called, will become clearer.

Another simple technique is to sort the disk directory every now and again, so that the most frequently accessed files are near the beginning. Obviously, this cannot be done by a standard sort program, but must be done by hand. More on this in a minute.

The reason this works is that whenever dBase opens a file, it has to search sequentially through the disk directory to find it. The further back the file is, the longer it takes to find, a factor which becomes especially significant in hard disk systems. This restriction does not apply in CP/M Plus or Concurrent CP/M systems, however, as they do not perform sequential directory searches.

Next, minimise disk fragmentation. Here's what this means: the CP/M and DOS operating systems both feature dynamic storage allocation, that is, when a file is first created it is allocated enough space and not much more, but as records are appended the operating system allocates it more space from the unused areas of the disk.

If you first create a database on a blank ▷

disk with an APPEND FROM command, all the records will be contiguous (that is, occupying adjacent sectors) on the disk. Suppose you now create an index file. It will now occupy the next available space on the disk. Next you add more records to the database. They cannot be simply tacked on to the end of the original database, as that space is now being used by the index.

Worse, the index file will grow as you append more records, so that the database and index files will grow a little at a time, occupying alternate areas of the disk. Because they are intermingled like this, the operation of the system is slowed down, as the disk drive head has to move around the disk to get to the appropriate areas.

The situation gets worse as a disk is used more. Program files are created and deleted, temporary files come and go, and after a while the disk 'looks' like a patchwork quilt. The disk drive head is now perpetually moving back out to the disk directory (or in MS-DOS, the file allocation table) to work out where the next bit of the file is. This discards most of the cache buffering which is implemented in many disk controllers, and slows the whole system down.

Operation is considerably improved if files are homogeneous, that is, they are all in one piece. We'll see how to achieve this in a moment.

Sort Frequently

The final one of these three related techniques is to sort files into order frequently. This does not mean using the SORT verb, as you'll see. Why sort at all, you may ask? Doesn't dBase have index files to get around having to sort?

Well, yes, up to a point. Let's examine what happens when you read a couple of records in a typical program – let's say a label printer – which uses the database with an index file.

dBase first calculates the index file node which contains the next index entry. By multiplying this number by 4, it works out which operating system record (CP/M uses 128-byte records) this will be, and then requests the operating system to read four records starting at that record.

In order to find where that record is located on the disk, the operating system may well have to read the disk directory or file allocation table and then move the disk head to the appropriate point, involving either one or two slow moves of the disk head.

Having read the index node into memory, dBase can now examine it to find the record number it wants in the database. Through some more number-crunching, it works out the operating system record it requires, and issues another operating system request. Again, this may involve the operating system in reading the directory and then moving yet again to the part of the disk where the particular record is to be found.

So far, we've chalked up between two and four disk head moves, just to read one record. What happens when we want to read the next record?

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starting with a read of the index file. However, if the entry for the next key value is in the same node, dBase does not need to read it again, thus saving time.

Better still, if the database record which is required is in the same operating system record as the last one, the operating system will not need to read it again. In fact, the operating system always reads a sector at a time, which is 512 bytes for the IBM PC and other MS-DOS systems, and usually 1 Kbyte for CP/M systems. If your database has 200 byte records, therefore, on a CP/M system you can print five labels for only one disk read – provided they are all adjacent in the same sector – and *this only happens if the database is sorted into the index sequence.*

The best way to get all this sorted out is this: copy the files onto a blank disk, in order of frequency of access. This can be done using the PIP or COPY commands of the operating system, or from within dBase itself. Typically, you would want to copy the database and index files first, followed by the most frequently used command and screen format files. Then come things like the print format files; in general printing is such a slow process that a fraction of a second improvement due to the disk optimisation is not noticeable.

Don't worry about the dBase overlay file, DBASEOVR.COM, or dBase itself. DBASEOVR.COM is opened once and then left open, so its directory entry only needs to be accessed once. The same applies to DBASE.COM.

Rather than copying the database using PIP or COPY, however, it's better to use the COPY command within dBase while the database is in USE with the major index. This ensures that the copy of the index file is created in index sequence and is thus pre-sorted to take advantage of the operating system buffering described above.

You are ideally placed to do this if you have three disk drives, since you need to be able to copy from floppy to floppy or floppy to hard disk while running a dBase program. You may need to use a memory drive to get around this problem, or suitably distribute files on the disks. Basically what you need is a command file which prompts the user to change disks, performs RESETs at the appropriate times if required, and then QUITs TO a series of PIP or COPY commands to copy the command files in the right order.

All of the above has the benefit of defragmenting files, sorting the directory and sorting the database for fastest access. It also has the side benefit of backing up the database, which is worth performing regularly in itself!

Different Disks

Next tip: rather than keep the database and index files on the same disk, put the database on B: and the index on A:. The reason is this: movement through an indexed file involves moving the disk head from one file to the other, possibly via the disk directory for good measure.

With the database and index split onto separate disks, the heads can simply be left over the appropriate files and dropped into position as required, rather than having to move between them. This simple modification – it basically means moving the files and inserting A: in front of the index file names in the source code – can produce an amazing speed improvement in some systems

On the subject of indexes, you'll have noticed that moving through an indexed file means reading two files and doing a lot of random positioning, and is obviously much slower than working on an unindexed file. However, many operations do not require the index to work. In particular, I'm thinking of the COUNT and SUM operations.

Unless the rules of mathematics have changed dramatically since I was at school, addition gives the same result, no matter which way you do it. In other words 2 + 3 = 3 + 2. SUMming and COUNTing an indexed database gives the same results without the index, something like ten times faster.

On the same subject, the LOCATE verb operates about ten times faster if you drop the index. The reason that you are using the LOCATE command is that the index is no use to you, anyway, otherwise you'd do a FIND, right?

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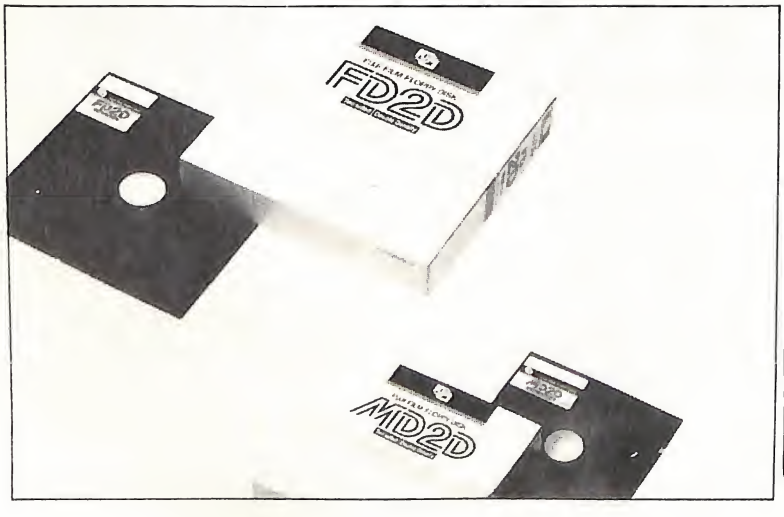

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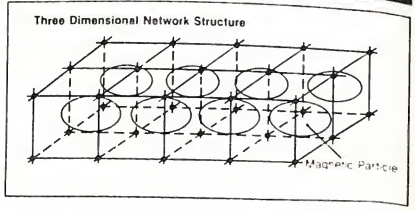

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Program: Primes (Eratosthene's sieve)

Compiler	Execution Time	Compilation Time	Program Size
HI-TECH C	40	100	4153
Whitesmiths	60	420	15745
C/80	63	140	3584
Aztec	78	144	9168

8086 BENCHMARK (IBM PC under MS-DOS)

Program: Eight Queens

Compiler	Execution Time	Compilation Time	Program Size
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But with both these techniques, remember to USE the index again before updating any key fields.

If possible, avoid indexes altogether. They slow down operation dramatically. If you don't believe me, just create a simple file and seven indexes for it, then try APPENDing to it!

For example, a mailing list might require indexing on individual surname and company name, plus postcode for producing mailing labels. In practice, the system is noticeably faster updating two indexes than three, so it makes sense to ignore the postcode index when appending records and then REINDEX just before printing mailing labels. This might take longer overall, but printing mailing labels often takes several hours anyway, so what's the difference?

Alternatively, use dSORT (not the built-in SORT command), as this is quite quick and reliable. If you are concerned at all about speed, avoid the built-in SORT command, as I am told that it is actually a bubble sort, which is about the slowest kind of sort imaginable. It also has (or at least had – I've never been game to try it again) a serious bug. dSORT is much better.

Finally, although your system might be written as lots of small command files, consider combining them into a few larger files. dBase can execute a command file of virtually unlimited length, although it starts to thrash a bit when executing loops over 5 Kbytes in length. The fewer files dBase has to open, the less frequently it has to move the disk head to the directory and the faster your program will execute.

Optimising for Disk Space

The same technique will also save you disk space, as the operating system allocates disk space in 1 Kbyte or 2 Kbyte chunks, regardless of the actual size of the file. Thus, two files which each appear as 2 Kbytes in a CP/M STAT display can often be combined into a single 2 Kbyte command file.

And finally, if you're optimising for space, you'll need to employ the reverse technique from the first one mentioned above. That is, look for any cases of information being repeated in a database, such as customer name and address, and remove it to a separate file.

This idea is known as database normalisation, and I'll deal with it in depth next month when we discuss database design. □

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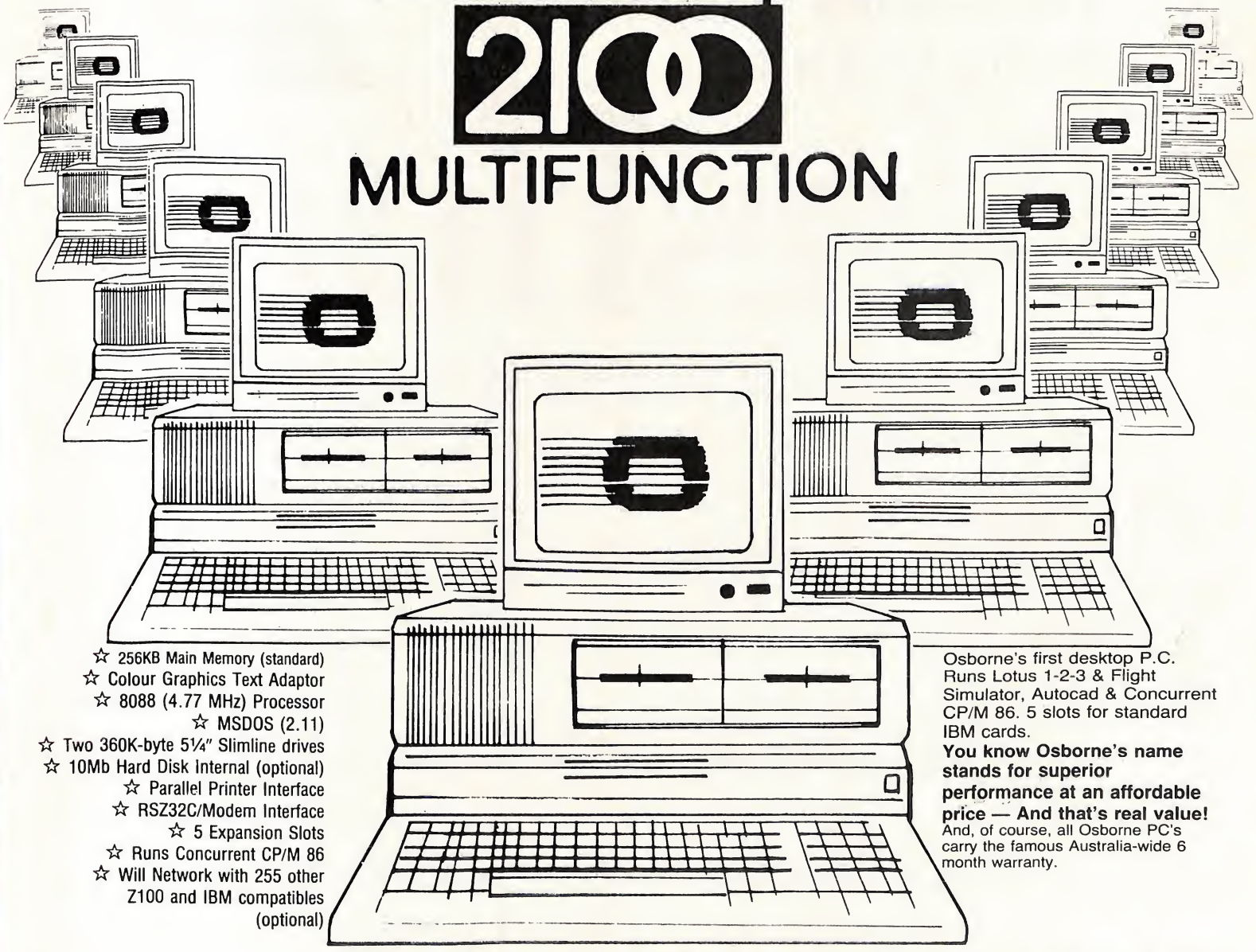

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BASICs Ain't BASIC – Part II

In part 1 we looked at Silicon Valley Software BASIC *as implemented on the Sord* M68 *machine. This month we take a closer look at the implementation on the* IBM 9000 *computer system.*

THE IBM 9000 computer is produced by the IBM Instruments Division for use with its instruments. It is, therefore, obviously very suitable for many scientific applications, although a repackaged business version known as the IBM 9002 is also available.

The machine is based on the Motorola 68000 processor running at 8 MHz and comes with a wide range of facilities for taking data from instruments. These include the IEEE-488 instrument bus, three 16-bit timers and a battery-backed clock, a bi-directional parallel port and RS-232C serial ports. Add to this the Analog Sensor Board and you get four auto-ranging 12-bit A/D converters, each capable of taking data at 30 Hz, eight LEDs, eight switches, four more RS-232 ports, four more parallel ports and two additional timers. The main unit can take up to five Mbytes of RAM, and a range of floppy disks and hard disks is available.

The keyboard is the now familiar IBM-PC keyboard, but in addition the IBM 9000 has ten softkeys on the monitor and 53 programmable keys on a separate keypad. The latter can be shifted, giving 106 programmable keys on the pad. Together with the monitor keys and the 40 possible function keys on the standard keyboard, this makes a grand total of 156 programmable keys. Finally, there is the four-colour graphics printer, capable of up to 200 dots per inch in red, green, blue and black.

However, only a monochrome screen is supported. The screen has an excellent resolution of 768 by 480 dots. Both text and graphics use the same screen, although, as we will see later, the screen can be divided into a number of independent smaller screens. The normal screen displays 25 lines by 80 characters of text, and in addition has a three-line window at the bottom known as the console box. The latter displays prompts for the use of ten softkeys on the monitor and other status information such as the date and time. The entire screen can be dumped to the printer using the SHIFT-PrtSc keys. Figure 1 is an example of a screen dump showing the default assignment of the keyboard function keys.

The test unit was equipped with 1 Mbyte of RAM, two 20 cm double density floppy disk drives and the four-colour graphics printer.

The Operating System

The operating system used by the IBM 9000 is a proprietary system known as Computer System Operating System or CSOS. It is a multi-tasking system and allows up to six tasks to be run in addition to the SYSTEM task.

Tasks are identified by a name of up to

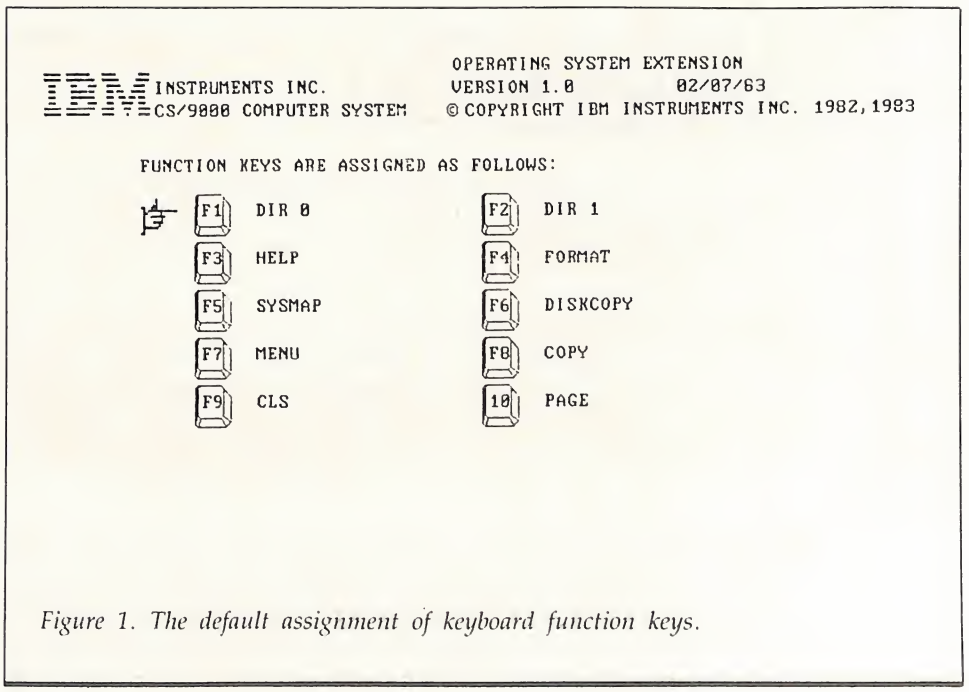

Figure 1. The default assignment of keyboard function keys.

eight alphanumeric characters. Each task has a Process Control Block associated with it, which contains information about the task such as its priority and its current status. Tasks are switched every twentieth of a second, at which time the highest-priority task gets access to the system resources. Tasks of equal priority take equal turns.

Tasks can be set up to communicate with each other and may address the screen at different times. On the other hand, the screen can be divided into five windows and different tasks can be set to address the different windows. Figure 2 shows the output of a multi-tasking demonstration in which four tasks are started one after the other. Each task has a screen window defined, in which its output appears as well as the prompts for inputs. The fifth window at the bottom of the screen shows the SYSTEM task where system commands can be issued.

Since hardware interrupts can be given a higher priority than any of the software tasks, a running task can be interrupted and modified to change priorities. New tasks can be added or old ones removed. A task may be programmed to remove itself under certain conditions or on completion, and tasks can be programmed to start at a given time.

Tasks can of course be originally written in different high-level languages, so it is quite possible to have one task originally written in Assembler monitoring an instrument, while a second task is compiling a FORTRAN program. A third task may be running some statistics on previously collected data, while a fourth is accepting keyboard entries into a BASIC program being developed. In this case the instrument task would probably be given the highest priority, followed by the BASIC development. This gives the user good response, yet since this task no doubt waits for keyboard input quite a lot of the time, the other two tasks don't lose out either.

CSOS does not give multi-user capability, but this is available under the optional XENIX operating system, under which three additional terminals can be connected, giving four users each with multi-tasking capability. BASIC is currently not available under XENIX, so we'll consider how well the BASIC language can use the IBM 9000 resources under CSOS.

Computer System BASIC

Computer System BASIC (or CS-BASIC) has all the features of SVS BASIC-PLUS outlined in part 1 of this series. IBM won't actually confirm that this BASIC was originally written by Silicon Valley Software Inc, but when two manuals contain identical examples and the same typing errors one gets a little suspicious. The 15-digit precision in real numbers, the matrix commands, the number strings with up to 55-digit precision and all the program structure commands described in part 1 of this series are there. What made me certain, though, was discovering that the same error occurs in both versions: the system variable PI has exactly the same incorrect value as in SVS BASIC-PLUS. IBM claims that this will be corrected in the next version of CS-BASIC.

IBM has added a large number of enhancements over SVS BASIC-PLUS. The familiar TIME$ and DATE$ are there and RENUM is back. RENUM is clearly not part of the standard BASIC, as it accesses the disk drive to store a temporary file. There is also a FILES *drive number* command to list file names to the console, as well as several graphics commands.

There is currently no option to compile CS-BASIC, but this will also be added in the next upgrade under CSOS 1.1. Finally, there are a large number of extended I/O commands, which allow the user to access all peripherals – let's look at these in some more detail.

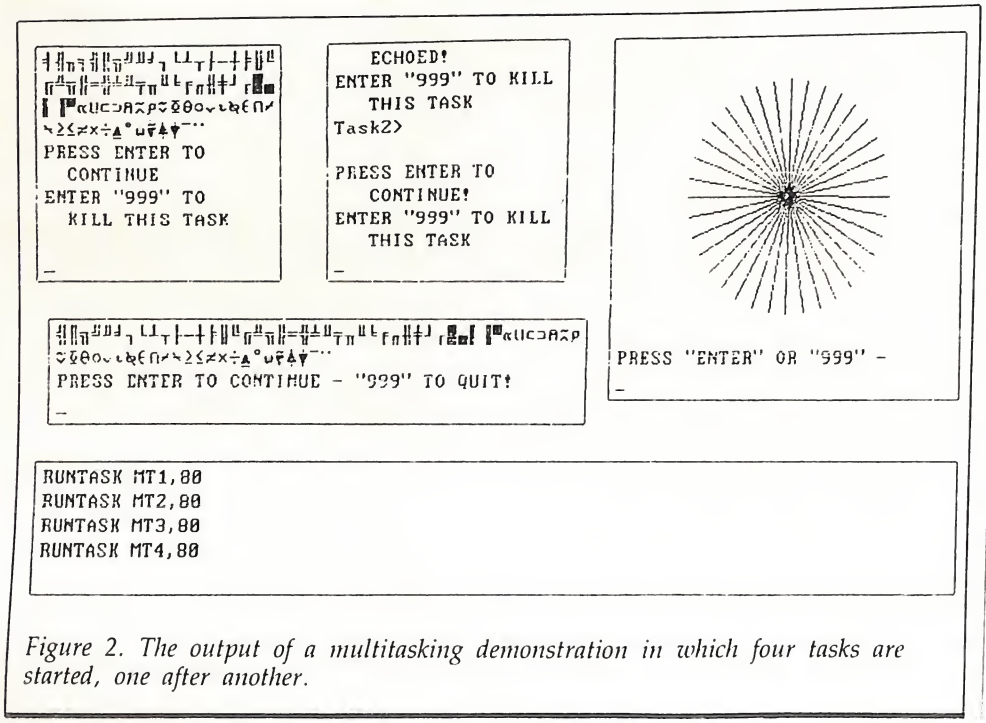

Figure 2. The output of a multitasking demonstration in which four tasks are started, one after another.

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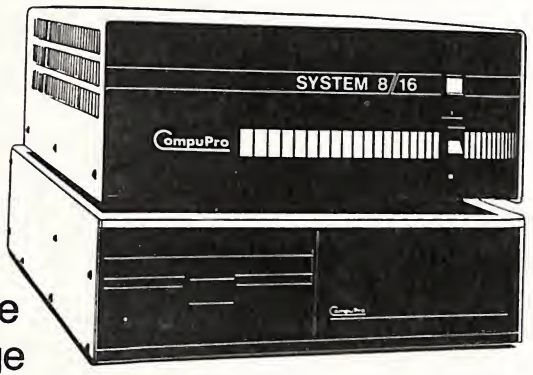

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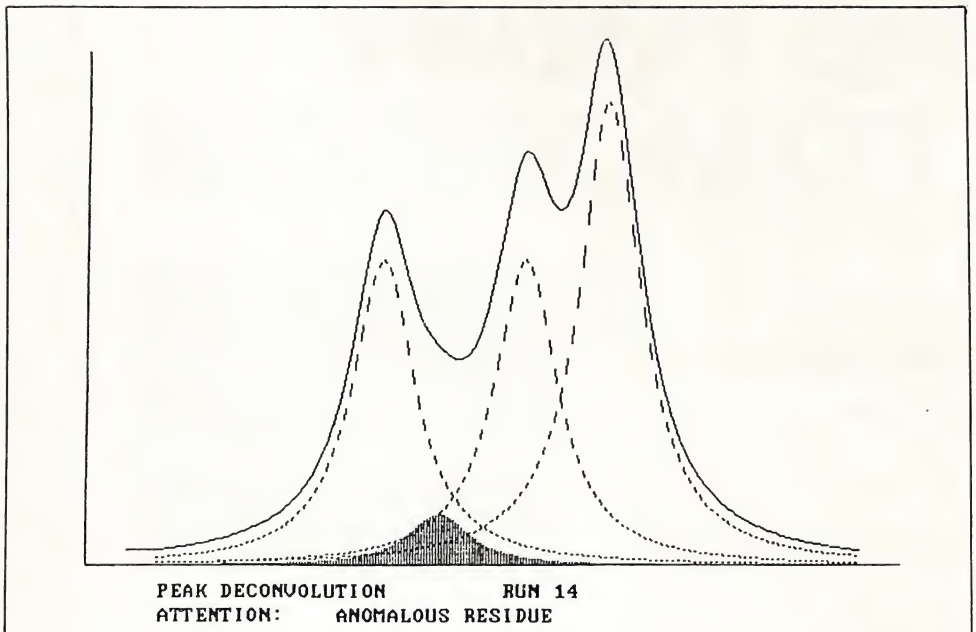

Figure 3. Graphics output from the simulated deconvolution program in Listing 1.

Program Size and Speed

The unit as tested contained 1 Mbyte of RAM, and when BASIC is the only task running (other than the SYSTEM task) it comes up with an enormous 974 Kbytes available for BASIC. It reminds me of when I upgraded my first machine from 4 Kbytes to a a big 16 Kbytes, which I thought was the ultimate in personal computer power. That was only about six years ago.

What's more, all of this 974 Kbytes is available for program and data space. I therefore decided to go all out and test its ability to invert matrices up to the limit set by the largest positive integer. This means that two 181 by 181 double precision matrices were held in memory at the same time, taking up about 0.5 Mbyte. The time taken for this inversion was just over two hours. This is not the sort of thing you are likely to do often and is a good example of a task to do at a lower priority while doing other more I/O oriented tasks at a higher priority.

The time taken to invert a 40 by 40 matrix was 82 seconds, which is significantly slower than the 55 seconds taken on the Sord M68. The longer time is caused by several factors, including the slower clock rate of 8 MHz in the IBM 9000 compared to 10 MHz in the Sord M68. In

```
1  CLS
2  A=90
3  POT=A+10
4  PAT=A
5  X0=180
6  N=0
7  K=20*(SQR(2)-1)*(SQR(2)-1)/2500
8  FOR I=200 TO 700 STEP 02
9  P1=198/(1+K*(I-360)*(I-360))
10 P2=198/(1+K*(I-460)*(I-460))
11 P3=300/(1+K*(I-520)*(I-520))
12 P4=33/(1+K*(I-400)*(I-400))
13 PT=P1+P2+P3+P4
14 N=N+1
15 IF N=1 THEN GOTO 20
16 LINE (I-1,PO1,I,P1+A)
17 LINE (I-1,PO2,I,P2+A)
18 LINE (I-1,PO3,I,P3+A)
19 GOTO 24
20 PO1=P1+A
21 PO2=P2+A
22 PO3=P3+A
23 N=-1
24 LINE (X0,POT,I,PT+A)
25 LINE (I,PAT,I,P4+A)
26 POT=PT+A
27 X0=I
28 NEXT I
29 LINE (150,A,730,A)
30 LINE (150,A,150,420)
31 FOR I=1 TO 24
32 PRINT " "
33 NEXT I
34 PRINT "
35 PRINT "
36 INPUT A$
37 END
PEAK DECONVOLUTION          RUN 14"
ATTENTION:     ANOMALOUS RESIDUE"
```

Listing 1. A sample program in CS-BASIC.

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addition, some time is required for housekeeping in the multi-tasking environment, even though only two tasks were running. Even the enhancements to the BASIC may have an effect. I also checked the time to calculate EXP(10) 10,000 times, which turned out to take exactly the same time as on the Sord, thus showing again how tricky speed comparisons can be.

The IBM 9000 machine certainly gives a great impression of speed in the graphics area. Drawings are very fast and the resolution is excellent.

Graphics Commands

There are five graphics commands in CS-BASIC, which doesn't sound like a great number, but they're quite powerful. The graphics screen has a resolution of 768 by 480, so that in the commands listed below X = 0 to 767 and Y = 0 to 479. The point 0,0 is in the bottom left-hand corner of the screen, which is convenient since that is where you would expect to find the origin of most graphs. Hopefully others will follow suit and adopt this sensible standard instead of the more common 0,0 graphics originating in the top left-hand corner of the screen.

The five graphics commands are:

PSET(X,Y[,mode])
LINE(X1,Y1,X2,Y2[,mode])
FILL(X1,Y1,X2,Y2[,mode])
ELLIPSE(X1,Y1,X2,Y2[,mode])
TEXT (X,Y, string[, size[, orientation[, mode]]])

What makes these commands so powerful is the mode option. Mode has the values 0 = OFF, 1 = ON or 2 = XOR. Thus any of the commands can be used to turn points or lines and so on ON or OFF or to change the previous condition of the screen on a point-by- point basis. LINE draws a line from X1,Y1 to X2,Y2 and FILL fills a rectangle defined by the two opposite corners X1,Y1 and X2,Y2. ELLIPSE draws an ellipse with X1,Y1 as the centre and X2 and Y2 as the horizontal and vertical limits. This means that X2-X1 is the horizontal radius and Y2-Y1 is the vertical radius. By the proper choice of X2 and Y2 we can therefore also draw a circle with its centre at X1,Y1. Figure 3 shows a sample graphics output produced by the simulated deconvolution program in Listing 1. Finally the TEXT command allows us to draw text on the graphics screen starting at X,Y in various sizes (one to eight times the standard size) and in four orientations ▷

```
FONT : WIDTH : DENSITY

CORRESPONDENCE: SINGLE: 10   CHAR/INCH
CORRESPONDENCE: SINGLE: 12   CHAR/INCH
CORRESPONDENCE: SINGLE: 16.8 CHAR/INCH
CORRESPONDENCE : DOUBLE :
CORRESPONDENCE : DOUBLE : 12
CORRESPONDENCE: DOUBLE: 16.8 CHAR/INCH
GRAPHICS       : SINGLE: 10   CHAR/INCH
GRAPHICS       : SINGLE: 12   CHAR/INCH
GRAPHICS       : SINGLE: 16.8 CHAR/INCH
GRAPHICS       : DOUBLE :
GRAPHICS       : DOUBLE: 12
GRAPHICS       : DOUBLE: 16.8 CHAR/INCH
DRAFT QUALITY  : SINGLE: 10   CHAR/INCH
DRAFT QUALITY  : SINGLE: 12   CHAR/INCH
DRAFT QUALITY  : SINGLE: 16.8 CHAR/INCH
```

Figure 4. Extended I/O commands allow the operating specifications of the I/O devices to be changed. The pointer can be made to print in four different colours, four fonts, three densities 25 spacings and so on.

The orientations are:
0 = left to right
1 = bottom to top
2 = right to left and upside down
3 = top to bottom.

If that isn't enough, there are more graphics options available using the extended I/O commands.

Extended Input/Output

An instrument computer such as the IBM 9000, with its various peripherals such as graphics printers, split screens, A/D converters and the large number of programmable keys, would lose a great deal of its utility if these were not readily accessible from BASIC. The extended I/O commands provide this capability and almost half the 450-page BASIC manual is devoted to these commands.

The extended I/O commands have the general format:
CALL *routine name* (P1,P2, ... Pn)
where *routine name* is one of 14 different routines and P1 to Pn are the parameters required by the routine. The number of

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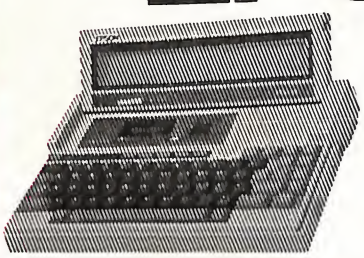

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parameters required varies from 0 to 7 and all the parameters must be specified for each routine. Some of the routines duplicate the facilities already available in the standard BASIC commands. For example CALL SYSOPEN is similar to the standard OPEN to open an I/O device, but CALL SYSOPEN provides some additional capabilities.

The I/O devices have reserved names six characters long, although some of the characters are trailing blanks, which must be specified. Examples include:

CON Keyboard
KPD Keypad/Softkeys
SCRNO Alpha Screen Window
CNSLO Console Display Box
ADC00 First A/D Converter
BUSA? First IEEE-488 Bus Device

The extended I/O commands provide not only for synchronous and asynchronous READ and WRITE capabilities of all the I/O devices, but also allow the operating specifications of the I/O devices to be changed. For example, the printer can be made to print in four different colours, four different fonts, three densities, 25 spacings and so on. Figure 4 shows some of the results which can be obtained, although it probably does not do justice to the original, which was in four colours.

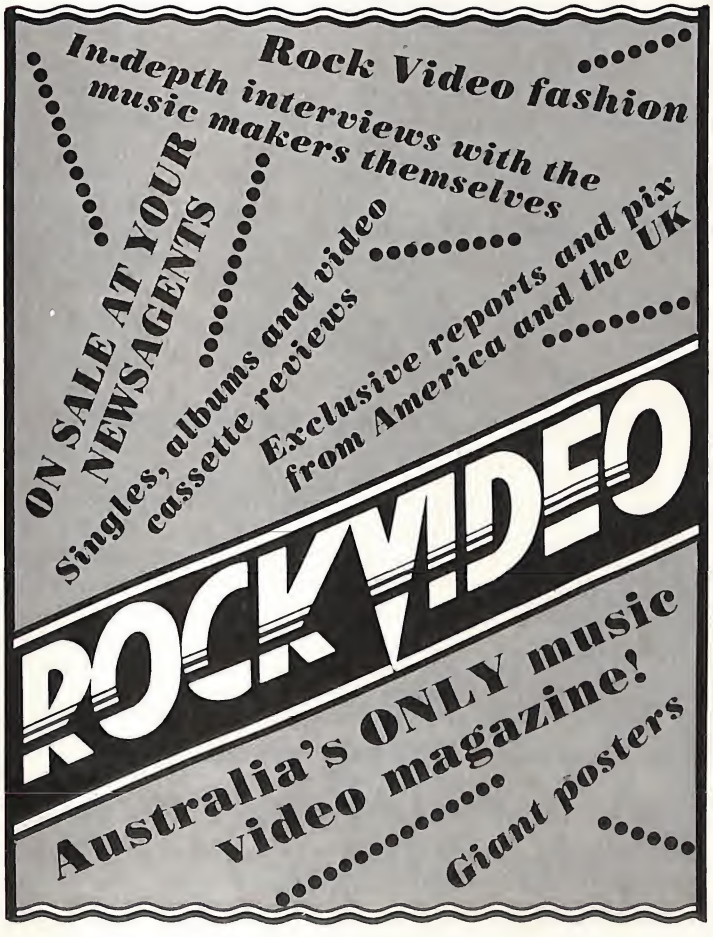
This extended I/O capability also allows the screen to be divided into up to five separate screens, each with its own cursor and its own scrolling capability. The command which provides all this power is CALL SYSFUNC (P1,P2). This command must be preceded by an OPEN or CALL SYSOPEN command to open the device. The P1 parameter is the logical unit number of the device, while P2 is the start of a group of additional integer parameters known as the function packet. The function packet starts with a function number, which has a specific meaning for each I/O device, followed by any parameters required. The function packet is passed to the CALL SYSFUNC command by specifying in P2 an array element, which is the start of the function packet. Since the function packet can only accept integer values this must be an integer array, which must of course be previously dimensioned and filled with the appropriate values.

The extended I/O CALLs clearly take some getting used to, but they provide complete power over all I/O accessories and all options are clearly described in the manual.

Conclusions

The IBM 9000 Computer System is a very powerful machine, and shows convincingly that the distinction between a microcomputer and a minicomputer is rapidly disappearing. The BASIC language provides excellent speed, high precision and complete power over all the facilities available on this machine. The manual is IBM quality, which is all that needs to be said about it.

In an instrumentation environment the CS-BASIC provides all the flexibility one is likely to need in such situations. In a business environment it is probably more powerful than is required, but that power is always there to solve tomorrow's problems. □



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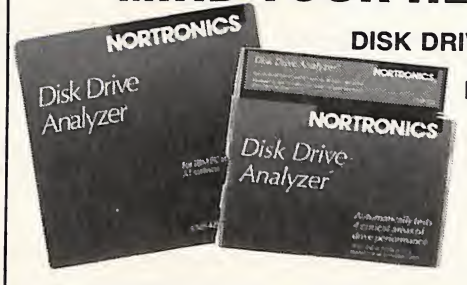

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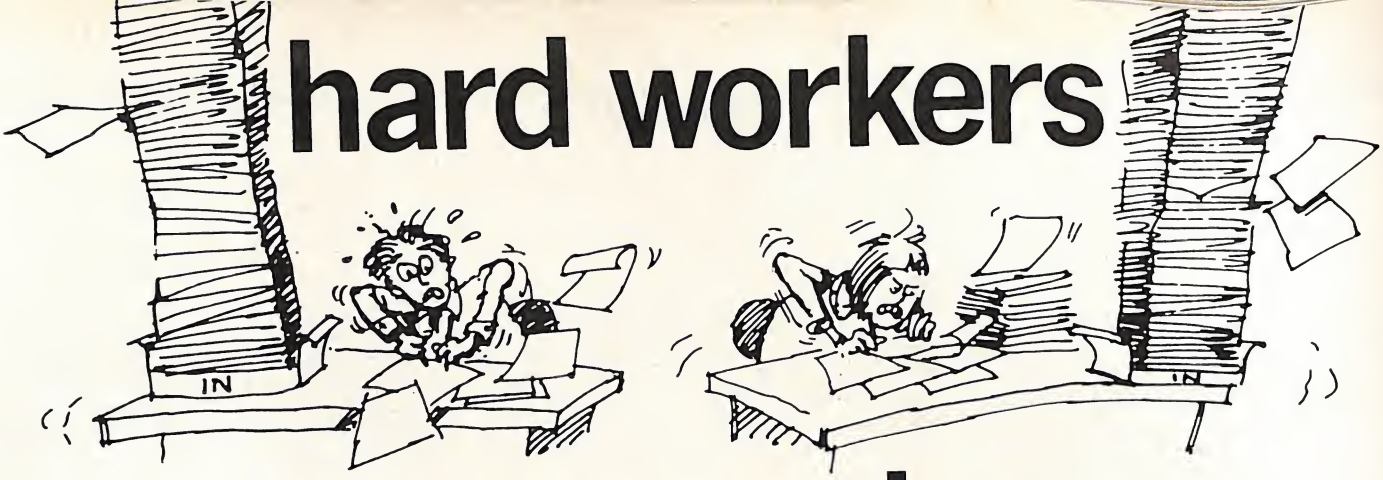

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Pocket Programs

Apple II

CUSTOM LETTERHEADER

Custom Letterheader is a program I wrote to enable people who own a small business to create custom letterheads and store them on disk. The program offers you five options.

The create option allows you to produce your own letterheads. The computer prompts you for the type of font you wish to use, and prints the heading you type in in this style. The address is set for printing in compressed mode, but this can be changed by altering the character code held in CD$ at line 600. The computer also asks for a window character, which will be printed across the top of the sheet of paper to form the border.

Custom Letterheader treats each letterhead you save as a separate (sequential) file. This lets you allocate each letterhead a separate distinctive name.

The program can easily be converted to any machine that runs most common dialects of BASIC. The only special features of MBASIC the program uses are in the file handling routines, but if you cannot convert these (or don't want to) the program will run just as well without them.

If your printer is a non-Epson the manual will supply the control codes needed for conversion in lines 430-460.

Martin Donnon
Windsor Gardens, NSW

****
****
*
DAISY'S

13 high street SOUTH BRIGHTON

```
10 '**********************************
11 '*        CUSTOM LETTERHEADS      *
12 '*                                *
13 '*               BY               *
14 '*                                *
15 '*          MARTIN DONNON         *
16 '*             FOR THE            *
17 '*                                *
18 '*           APPLE ][+            *
19 '*             WITH               *
20 '*                                *
21 '*          Z80 SOFTCARD          *
22 '*                                *
23 '*        AND EPSON PRINTER       *
24 '**********************************
25 '
26 '
100 CLEAR
110 HOME
120 PRINT :PRINT :PRINT: PRINT
130 PRINT TAB(15);"LETTERHEADS"
140 PRINT :PRINT
150 PRINT TAB(16);"1 :CREATE"
160 PRINT TAB(16);"2 :LOAD"
170 PRINT TAB(16);"3 :SAVE"
180 PRINT TAB(16);"4 :PRINT"
190 PRINT TAB(16);"5 :END"
200 PRINT :PRINT :PRINT
210 LINE INPUT"YOUR CHOICE 1-5",CH$
220 CH=VAL(CH$)
230 IF CH<1 OR CH>5 THEN GOTO 110
240 ON CH GOSUB 280,720,640,800
250 IF CH=5 THEN HOME:PRINT "GOODBYE !":
 END
260 GOTO 110
270 '
280 ' *** CREATE A LETTERHEAD
290 '
300 HOME
310 PRINT "CREATE FILE:"
320 PRINT:PRINT
330 PRINT"WHAT TYPE OF FONT DO YOU WISH
TO USE"
340 PRINT:PRINT
350 PRINT TAB(13);"1 :ITALIC"
360 PRINT TAB(13);"2 :EXPANDED"
370 PRINT TAB(13);"3 :COMPRESSED"
380 PRINT TAB(13);"4 :NORMAL"
390 PRINT:PRINT
400 LINE INPUT "YOUR CHOICE 1-4",C$
410 C=VAL(C$)
420 IF C<1 OR C>5 THEN 300
430 IF C=1 THEN MC=79:CD$=CHR$(27)+")"+C
HR$(27)+"4":CO$=CHR$(27)+"#"+CHR$(27)+"5"
440 IF C=2 THEN MC=39:CD$=CHR$(27)+"W"+C
HR$(1):CO$=CHR$(27)+"W"+CHR$(0)
450 IF C=3 THEN MC=131:CD$=CHR$(15):CO$=
CHR$(18)
460 IF C=4 THEN MC=79:CD$="":CO$=""
470 HOME
480 LINE INPUT "WINDOW CHARACTER :=",WIN
$
490 IF LEN(WIN$)>1 OR LEN(WIN$)<1 THEN 4
70
500 PRINT:PRINT
510 PRINT"HEADING NOT MORE THAN ";MC;" C
HARACTERS"
520 LINE INPUT "HEADING :=",HD$
530 IF LEN (HD$) >MC THEN HOME :GOTO700
540 PRINT :PRINT
550 MC =50
560 PRINT "ADDRESS NOT MORE THAN ";MC;"
CHARACTERS"
570 LINE INPUT "ADDRESS :=",AD$
580 IF LEN(AD$)>MC THEN HOME:GOTO740
590 HD$ = CD$ + HD$
600 CD$ = CHR$(15)
610 AD$ = CD$ + AD$
620 RETURN
630 '
640 ' *** WRITE ROUTINE
650 '
660 GOSUB 1050
670 OPEN "O",#1,FILE$
680 WRITE #1 ,WIN$;HD$;AD$
690 CLOSE #1
700 RETURN
710 '
720 ' *** READ ROUTINE
730 '
740 GOSUB 1050
750 OPEN "I",#1,FILE$
760 INPUT #1,WIN$,HD$,AD$
770 CLOSE #1
780 RETURN
790 '
800 ' *** PRINTER OUTPUT ROUTINE
810 '
820 HOME:INPUT" HOW MANY COPIES DO YOU W
ANT ";NC
830 FOR I = 1 TO NC
840 HOME
850 PRINT "PRINT MODE:"
860 PRINT:PRINT
870 PRINT "PREPARE YOU'RE PRINTER THEN P
RESS A KEY"
880 A$ =INPUT$(1)
890 GOSUB 980
900 LPRINT CHR$(13)
910 LPRINT HD$
920 LPRINT CO$
930 LPRINT AD$
940 LPRINT CHR$(18)
950 NEXT I
960 RETURN
970 '
980 ' *** WINDOW PRINTER
990 '
1000 FOR A = 1 TO 79
1010 LPRINT WIN$;
1020 NEXT A
1030 RETURN
1040 '
1050 ' *** FILENAME GET ROUTINE
1060 '
1070 HOME
1080 LINE INPUT "FILENAME :=",FILE$
1090 IF LEN(FILE$)<1 OR LEN(FILE$)>6 THE
N 1070
1100 RETURN
1110 END
```

Amstrad

DOODLE DRAWING PROGRAM

This program lets beginners and new owners of the Amstrad draw doodles in high-resolution graphics with the cursor keys or the joystick. The program is fully commented, so people can experiment and understand a little about the 'real-beaut' graphics of this machine. I hope you all have as much fun as my children did with this simple program.

R. Eiberg
Manly, NSW

```
100 REM *** DOODLE/DRAW, R.Eiberg Jan.85
 ***
110 REM *** drawing prog. uses joystick
or cursor keys to DRAW. Copy or Fire
keys to ERASE. ****
120 CLS:REM *** clear screen ***
130 MODE 1:REM  ***  sets  graphic/text
mode ***
140 ORIGIN 320,200:REM *** sets GRAPHIC
cursor to screen centre ***
150 e=1:REM *** var. for erase flag ***
160 INK 3,0:REM  ***  pen#3 ink set  to
 black (to erase) ***
170 INK 2,26:REM  ***  pen#2 ink set to
bright white (display) ***
180 DRAW x,y,2:REM *** display starting
point ***
190 IF  JOY(0)=1  OR  INKEY(0)=0  THEN
Y=Y+0.5:GOTO 250:REM *** input 'up' ***
200 IF  JOY(0)=2  OR  INKEY(2)=0  THEN
y=y-0.5:GOTO 250:REM*** INPUT 'down' ***
210 IF  JOY(0)=4  OR  INKEY(8)=0  THEN
X=X-0.5:GOTO 250:REM*** INPUT 'left' ***
220 IF  JOY(0)=8  OR  INKEY(1)=0  THEN
X=X+0.5:GOTO 250:REM** input 'right' **
230 IF  JOY(0)=16  OR  INKEY(9)=0  THEN
e=e+1:FOR n=1 TO 200:NEXT :GOTO 250:REM
*** input 'erase'(fire/copy key) ***
240  GOTO 190:REM  ***  test for input,
line 190 onwards ***
250 IF e=2  THEN 270:REM *** erase flag
var. set ***
260 DRAW x,y,2:e=1:GOTO 190:REM *** draw
 with pen#2 (normal) ***
270 DRAW x,y,3:GOTO 190:REM*** DRAW with
 PEN#3 (ERASE) ***
```

VZ200

PAINTER

Painter is a challenging game where scoring is difficult. The program uses joysticks but can easily be modified to use the keyboard instead.

The aim of the game is to paint as much of the screen as possible before you run out of space. You must avoid crossing your tracks, the border around the screen and the randomly placed red landmines.

Bruce Daniel
Mudgee, NSW

```
10 ' PAINTER - BY BRUCE DANIEL
20 HS=0
30 CLS
40 FORI=28704 TO 29119 : POKE I,128 : NEXTI
50 FORI=1 TO 30:POKE 28672+I,179 :POKE 29120+I,188 :NEXTI
60 FORI=28704 TO 29088 STEP 32:POKE I,181:POKE I+31,186 :NEXTI
70 POKE 28672,177:POKE 28703,178:POKE 29120,180:POKE 29151,184
80 FORI=1TO4+RND(4):POKE 28672+RND(12)*32+RND(28)+34,191:NEXTI
90 SC=0:MV=1:CP=28704:COLOR2
100 PRINT@495,"HIGH SCORE:";:HS$=STR$(HS)
110 HS$=RIGHT$(HS$,LEN(HS$)-1)
120 IFLEN(HS$)<3THENHS$="0"+HS$:GOTO120ELSEPRINTHS$;:SOUND23,3
130 PRINT@481,"SCORE :";:SC$=STR$(SC):SC$=RIGHT$(SC$,LEN(SC$)-1)
140 IFLEN(SC$)<3THENSC$="0"+SC$:GOTO140ELSEPRINTSC$;
150 JK=INP(43)ANDINP(46)AND31
160 IFJK=30THENMV=-32ELSEIFJK=29THENMV=32
170 IFJK=27THENMV=-1ELSEIFJK=23THENMV=1
180 CP=CP+MV
190 IFPEEK(CP)<>128THEN220
200 POKECP,159:SC=SC+1:GOTO130
210 '
220 PRINT@267,"GAME OVER";' INVERSE
230 SOUND16,1
240 IFSC>HSTHENHS=SC
250 PRINT@417,"     PRESS <FIRE> TO PLAY     ";'INVERSE
260 JK=INP(43)ANDINP(46)AND31
270 IFJK<>15THEN260
280 GOTO 30
```

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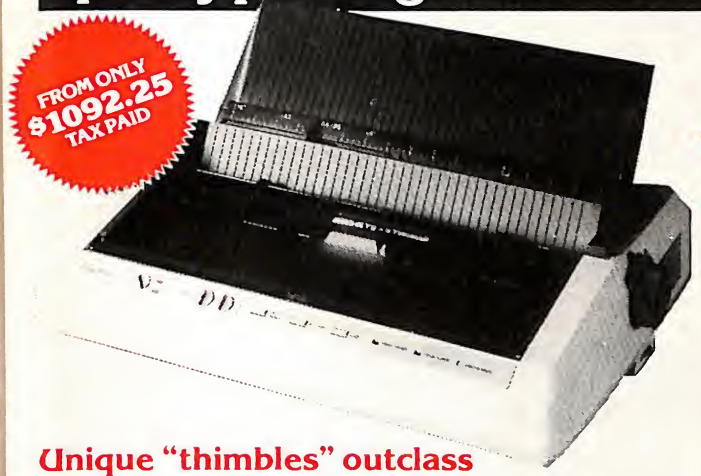

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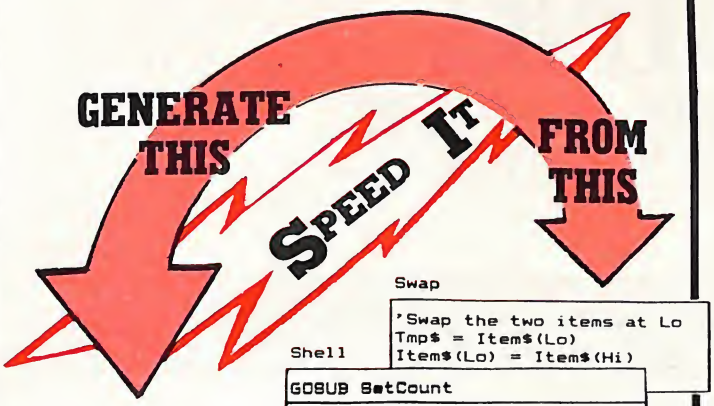


```
100 'Shell: Procedure
110 'Shell Sort algorith
120 '
130 GOSUB 560:    'SetCou
140 DIM ITEM$(COUNT)
150 GOSUB 640:    'SetDat
160 SPAN = COUNT
170 WHILE SPAN>1
180     'Cut the Span wi
190     SPAN = INT(SPAN/
200     LIM = COUNT - SP
210     WHILE J <= LIM
220         LO = J
230         WHILE LO >=
240             'Need to
250             HI = LO
260             IF ITEM$
270             GOTO 320
280                 'The
290                 GOSU
300                 LO =
310             GOTO 350
320             '$001
330                 'Els
340                 LO =
350             '$002
360         WEND
370         J = J+1
380     WEND
390 WEND
400 'Print the sorted array
410 GOSUB 740:    'DisplayData
```

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Sharp MZ700

SAFE CRACKER

This program is a number guessing game. Players must guess a set of three numbers to open a safe's combination lock. The combination is selected at random by the computer and is different for every game.

Tony Calciano
Bankstown, NSW

```
1 PRINT"DO YOU NEED INSTRUCTIONS (YES-1)
  (NO=0)"
2 INPUT Y,N
3 IF Y=1 THEN 5
4 IF N=0 THEN 110
5 PRINT"ALL YOU HAVE TO DO IS TO GUESS T
HE RIGHT NUMBER OF THE SAFE AND THEN GUE
SS WHICH DOOR IS THE RIGHT DOOR TO OPEN"
10 PRINT"***************LOCK UP***********
*********"
50 REM
110 T=0
120 PRINT"THE 1st NUMBER IS BEETWEEN 1 &
 50"
130 PRINT"*************GOOD LUCK********
**********"
140 A=INT (50*RND(1))+1
150 PRINT"WHAT IS YOUR GUESS"
155 INPUT G
160 T=T+1
170 IF G=A THEN 200
180 IF G<A THEN 210
185 IF G>A THEN 190
190 PRINT"TOO BIG..TRY AGAIN"
195 GOTO 150
200 PRINT"EXCELLENT.....YOU GUESSED THE
RIGHT      NUMBER"
205 GOTO 220
210 PRINT"TOO SMALL..TRY AGAIN"
215 GOTO 150
220 PRINT"YOU ARE GOING FOR THE 2nd NUMB
ER"
230 PRINT"WHICH IS BETWEEN 1 & 500"
240 B=INT (500*RND(1))+1
250 PRINT"WHAT IS YOUR GUESS"
255 INPUT G
260 E=E+1
270 IF G=B THEN 300
280 IF G<B THEN 310
285 IF G>B THEN 290
290 PRINT"TOO BIG..TRY AGAIN"
295 GOTO 250
300 PRINT"YOU HAVE CORRECTLY GUESSED THE
 2nd       NUMBER"
305 GOTO 320
310 PRINT"TOO SMALL...TRY AGAIN"
315 GOTO 250
320 PRINT"YOU ARE GOING FOR THE THIRD"
```

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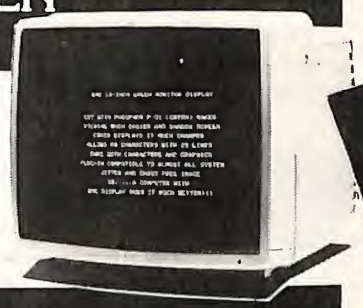

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MAG 325B

Sharp MZ700

Continued from page 162

```
330 PRINT"NUMBER WHICH IS BETWEEN 1 & 10
00."
340 C=INT (1000*RND(1))+1
350 PRINT"WHAT IS YOUR GUESS"
355 INPUT G
360 Z=Z+1
370 IF G=C THEN 400
380 IF G<C THEN 410
385 IF G>C THEN 390
390 PRINT"TOO BIG....TRY AGAIN"
395 GOTO 350
400 PRINT"YOU HAVE GUESSED THE 3rd NUMBE
R AND     FINAL NUMBER "
405 GOTO 420
410 PRINT"TOO SMALL...TRY AGAIN"
415 GOTO 350
420 PRINT"THE COMBINATION OF THE LOCK IS
 ";A;B;C

422 PRINT
424 PRINT
426 PRINT
428 PRINT
432 PRINT
434 PRINT
436 PRINT
438 PRINT
440 PRINT"THE SAFE IS NOW OPEN AND IN FR
ONT OF YOU THERE ARE 3 DOORS LABELLED 1,
2 & 3"
450 PRINT"ONE OF THEM WILL BLOW UP THE E
ARTH BUT  THE OTHER 2 WILL SAVE THE EART
H AND MAKE YOU THE HERO OF THE EARTH....

460 PRINT"***************GOOD LUCK*******
**********"
480 O=INT (3*RND(1))+1
490 PRINT"WHAT IS YOUR GUESS"
495 INPUT G
500 IF G=O THEN 520
505 IF G<O THEN 515
510 IF G>O THEN 515
515 PRINT"CONGRATULATIONS......YOU HAVE
SAVED THE EARTH FROM ITS DOOM"
517 GOTO 530
520 PRINT"YOU SILLY PERSON THE EARTH IS
DOOMED....THAT WAS THE WRONG DOOR"
525 GOTO 530
530 PRINT"DO YOU WANT ANOTHER GO (YES=1)
 (NO=0)"
540 INPUT Y,N
550 IF Y=1 THEN 1
560 IF N=0 THEN 570
570 PRINT"OK SO LONG.....................
..........."
580 END
```

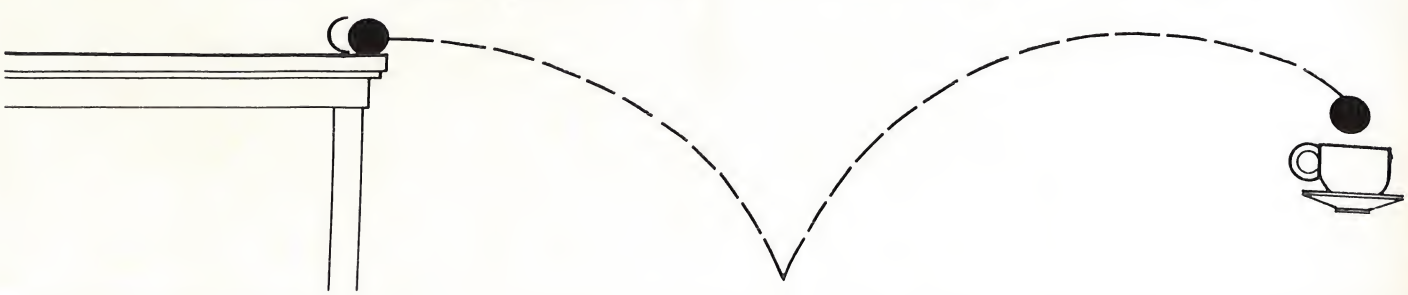
Microbee

CUPPIN

Cuppin simulates the fall of a bouncing ball from a table. The idea is to choose the right strength to push the ball to get it into the cup on the right-hand side of the screen. Gravity and table height vary.

Richard Larkin
Dee Why, NSW

```
ØØ1ØØ REM CUPPIN 11/12/84 RICHARD LARKIN.
ØØ11Ø G1=-(RND+RND+RND+RND+RND+7.3) : H1=RND*2Ø+24
ØØ12Ø G=Ø : CLS : PRINT \\"CUPPIN"\"Gravity "G1\"Height  "H1 : INPUT"Push m/s"V1
 : IF V1<1 THEN 12Ø
ØØ13Ø X1=Ø : V2=Ø : Y1=H1 : T1=1/V1 : A=INT(X1) : B=INT(Y1)
ØØ14Ø CLS : LORES : PLOT 12Ø,3 TO 12Ø,Ø TO 124,Ø TO 124,3
ØØ15Ø V2=V2+G1*T1 : X1=X1+V1*T1 : Y1=Y1+V2*T1
ØØ16Ø IF Y1<1 AND V2<Ø THEN LET G=G+1 : V2=-V2*.7 : Y1=Ø : PLAY 3 : IF G=8 THEN
CURS 5,5 : PRINT "To many bounces!" : GOTO 2ØØ
ØØ17Ø C=INT(X1) : D=INT(Y1)
ØØ18Ø IF POINT(C,D) THEN CURS 5,5 : PRINT "Missed!!" : GOTO 2ØØ
ØØ19Ø RESET A,B : SET C,D : A=C : B=D : IF X1<124 AND X1>12Ø AND Y1<4 THEN CURS
5,5 : PRINT"Well done!!" ELSE 15Ø
ØØ2ØØ I=USR(32774) : CLS : PRINT\\\"A) SAME"\"B) NEW"
ØØ21Ø K1$=KEY : IF K1$="A" THEN 12Ø ELSE IF K1$="B" THEN 11Ø ELSE 21Ø
```



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A complete range of portable peripherals has been designed to go with it.

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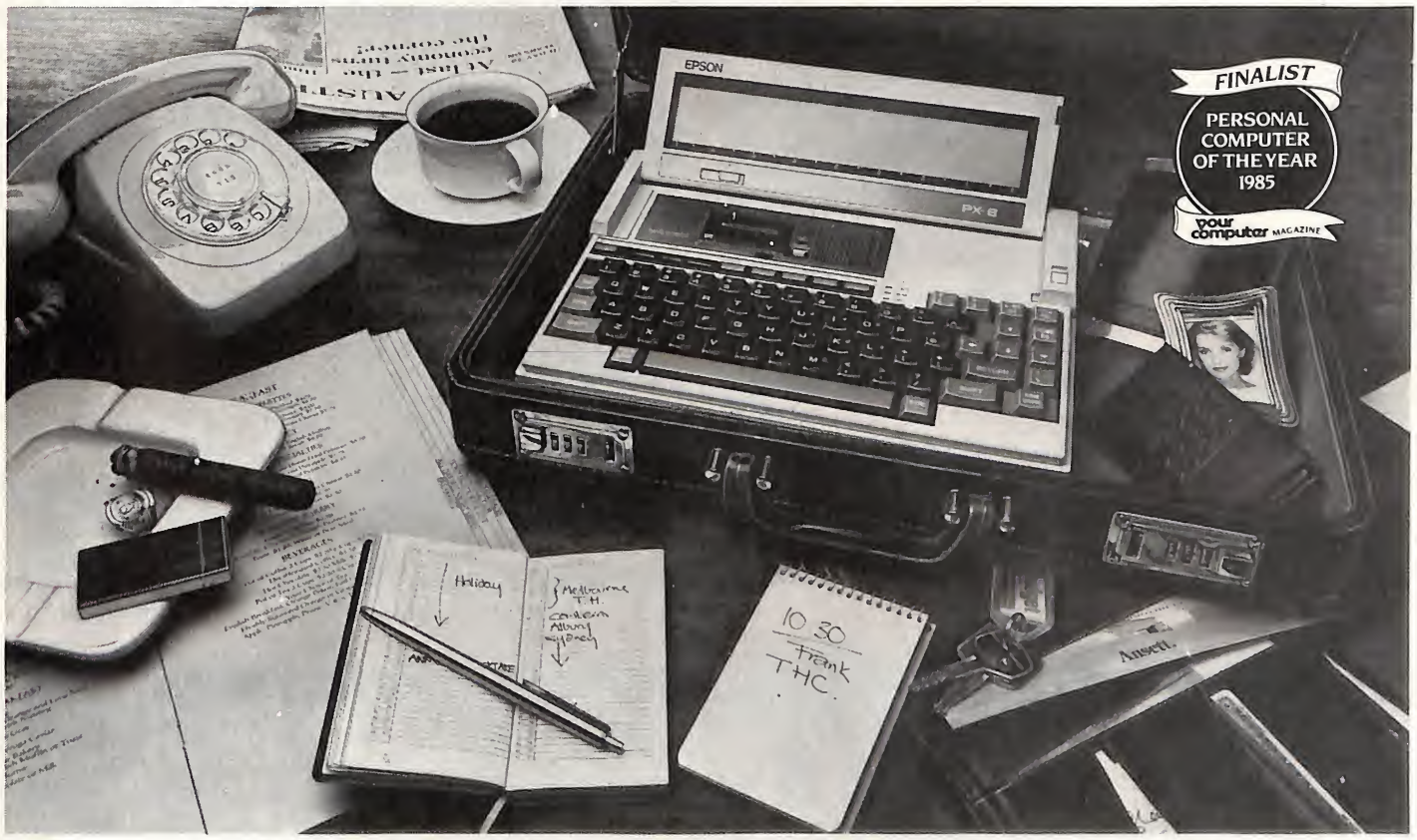

HIDDEN IN THIS PICTURE IS A DESKTOP COMPUTER.

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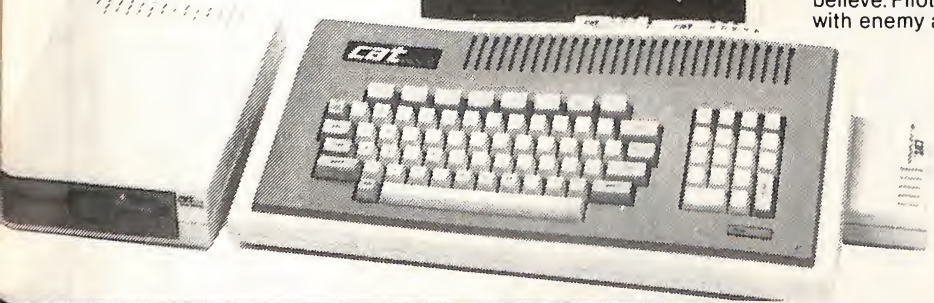

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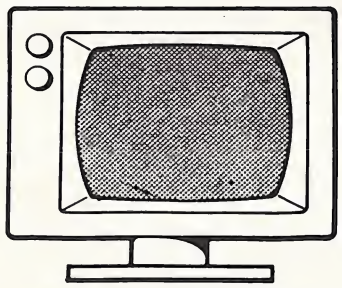

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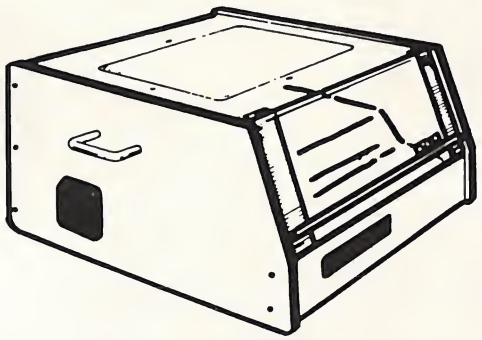
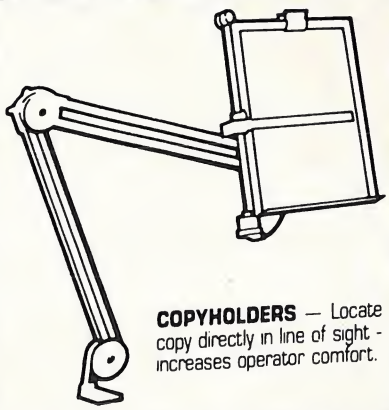


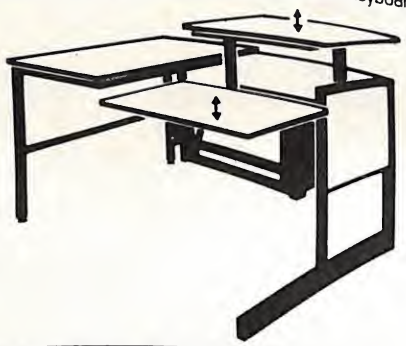
PRINTER STANDS — Various models designed to fit in to specific work situations - 5 designs available.

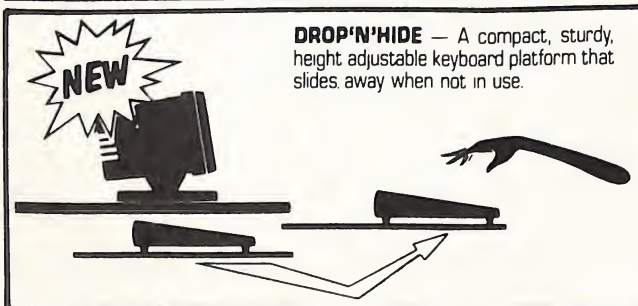
GAS LIFT CHAIRS — Fingertip chair height adjustment with stable 5 star base.



COPYHOLDERS — Locate copy directly in line of sight - increases operator comfort.

FLEXIBLE WORKSTATIONS — 10 different ergonomic designs for terminals with separate VDU's and keyboards.





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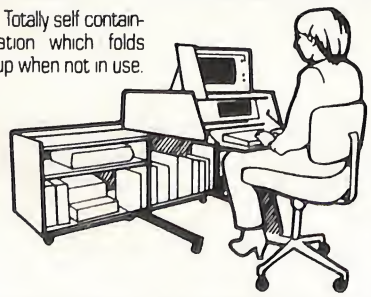

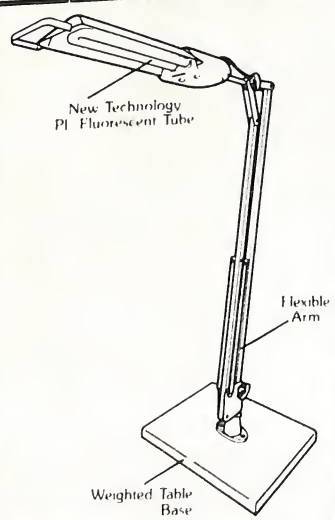

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K9 – DR WHO'S DOG

I was reading your *Bumper Book of Programs*, and thought I'd send in one of my own efforts.

This program draws the very famous Dr Who's robot dog, 'K9'. I hope you like it.

Jason Costa
Footscray, Vic

```
00010 CLS:HIRES
00100 POKE 220,-4
00110 PLOT 0,0TO50,100TO350,100TO400,0TO0,0
00120 PLOT 50,100TO80,120TO100,150TO325,150TO350,100
00130 PLOT 65,110TO0,160
00150 PLOT 130,150TO130,155TO180,155TO200,160TO200,150
00160 PLOT 330,140TO356,145
00170 PLOT 345,110TO365,115TO356,145
00180 PLOT 20,20TO380,20TO350,80TO50,80TO20,20
00190 PLOT 20,20TO60,50TO50,80
00200 PLOT 380,20TO340,50TO350,80
00210 PLOT 60,50TO340,50
00220 PLOT 356,144TO370,160:PLOT 365,116TO400,160
00225 CURS 22,9:PRINT"  K.9"
00230 PLOT 340,160TO430,160TO430,175TO400,175TO390,185TO340,185TO340,160
00235 FOR T= 1 TO 2000:NEXT T
00237 PLOT 430,172TO435,172TO435,167TO430,167
00239 FOR T= 1 TO 2000:NEXT T
00240 PLOT 435,170TO511,130
00241 PLOT 435,170TO511,129TO511,128TO435,170TO511,127TO511,126TO435,170TO511,12
5TO511,124TO511,123TO435,170TO511,122TO511,121TO511,120TO435,170
00242 PLOT 435,170TO511,110TO511,111TO435,170TO511,112TO511,113TO435,170TO511,11
4TO511,115TO435,170TO511,116TO511,117TO435,170TO511,118TO511,119TO435,170TO511,1
20
00245 PLAY 24,20
00260 CURS 55,6:PRINT"          "
00270 CURS 55,5:PRINT"              "
00280 CURS 55,8:PRINT"            "
00290 CURS 55,7:PRINT"          "
00300 CURS 55,9:PRINT"              "
00310 CURS 60,10:PRINT"      "
00400 FOR T= 1 TO 3000:NEXT T
00410 PLOT 395,180TO396,181TO397,182TO398,183TO399,184TO400,185TO401,186TO402,18
7TO403,188TO404,189TO405,190TO406,191TO407,192TO408,193TO409,194TO410,195:PLOT 4
08,197TO412,193
00420 PLAY 5
00430 FOR T=1TO2000:NEXT T
00440 PLOTR 396,180TO396,181TO397,182TO398,183TO399,184TO400,185TO401,186TO402,1
87TO403,188TO404,189TO405,190TO406,191TO407,192TO408,193TO409,194TO410,195:PLOTR
 408,197TO412,193
00450 PLAY 5
00460 GOTO 460
```


MicroBee Games

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Microbee

ELONGATED CHARACTERS

This routine re-programs the Programmable Character Generator (PCG) for a more decorative font. As the sample printout shows, it stretches the characters to make them longer than they normally are. Due to the gauge of the dot-spacing on my printer, the letters are shorter here than they are on the screen.

John Quinn
Casino, NSW

```
00010 REM * Elongated Chars *
00020 REM * by  John Quinn. *

00100 UNDERLINE:INVERSE:NORMAL
00110 FOR A=63488 TO 63488+128*16-1 STEP 16
00120 FOR B=1 TO 7:POKE A+B,PEEK(A+B+3):NEXT B
00130 FOR C=1 TO 3:POKE A+C+7,PEEK(A+11):NEXT C
00140 FOR N=0 TO 15:POKE A+N,255-PEEK(A+N):NEXT N
00150 NEXT A
00155 POKE 128,8:POKE 129,182:OUTL#1:POKE 63467,1
00160 CLS:FOR N=128 TO 129+126:PRINT CHR(N)" ";:NEXT N:END
00170 USR(15200)
```

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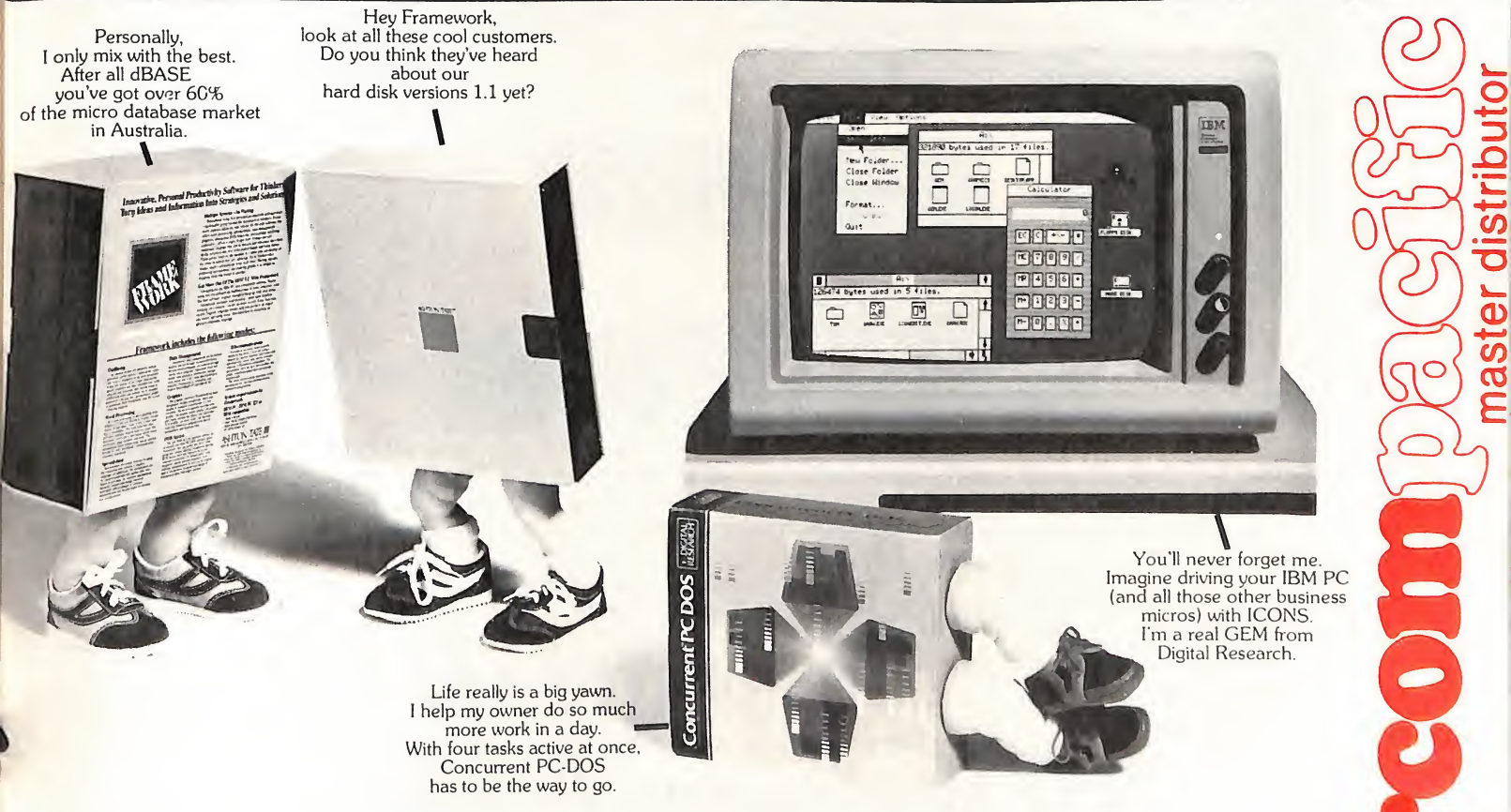
```
00100REM PIG 10/12/84 RICHARD LARKIN.
00110 CLS : PRINT\\\\"Welcome to P I G." : T=0 : C=0
00120 FOR X=1 TO 5 : PRINT "ME"C,,"YOU"T
00130 PRINT "ROUND"X\"YOUR THROW" : U=0
00140 PRINT U" so far."\"Do you wish to throw?"
00150 K1$=KEY : IF K1$="Y" THEN 160 ELSE IF K1$="N" THEN 200 ELSE 150
00160 R=INT(RND*6+1) : E=INT(RND*6+1)
00170 PRINT "O.K. you throw a"R" and a"E
00180 IF R+E=10 THEN PRINT "Piggy you bust !" : U=0 : GOTO 200
00190 U=U+R+E : GOTO 140
00200 T=T+U : U=0 : PRINT "MY THROW...."
00210 PRINT U" so far." : R=INT(RND*6+1) : E=INT(RND*6+1)
00220 PLAY 0,10 : PRINT "I've thrown a"R" and a"E
00230 IF R+E=10 THEN PRINT"OOOPS!! Never mind." : U=0 : GOTO 260
00240 U=U+R+E : IF X=5 AND C+U<T THEN 210 ELSE IF FLT(U)>RND*20+20 AND FLT(C+U)>
FLT(T)*.9 THEN PRINT "I'll quit while I'm ahead." : GOTO 260
00250 GOTO 210
00260 C=C+U : NEXT X : PRINT\\\ "Well that's our five rounds."\"and the winner i
s"; : FOR X=0 TO 10 : PRINT "."; : PLAY 0,2 : NEXT X
00270 IF C<T THEN PRINT "YOU" ELSE IF C=T THEN PRINT "BOTH OF US!" ELSE PRINT "M
E"
00280 I=USR(32774) : RUN
```

PIG

Pig is a game of dice, in which the idea is to throw a higher overall score than the computer. You and the computer can throw as much as you like, but if you throw 10 — that is 5 and 5, 4 and 6, or 6 and 4, you score zero for that round.

Richard Larken
Dee Why, NSW



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WF936/81

Microbee

```
00100 REM PROJECTILE MOTION 7/3/84 RICHARD LARKIN.
00110 POKE 162,30 : POKE 163,128 : POKE 257,2 : CLS
00120 UNDERLINE : CURS 20,2 : PRINT "<  Projectile Motion  >" : CURS 23,3 : PRIN
T "By Richard Larkin" : CURS 22,15 : PRINT "Hit any key to start" : NORMAL : CUR
S 192
00130 PRINT \"This program will ask you to input an angle, velocity, height"\"an
d gravity. It may then ask you the maximum height,"
00140 PRINT "distance travelled along the x-axis or hit velocity."\"It will then
 show you the trajectory of the falling object."
00150 PRINT "As the graph proceeds you may type 'I' to see the component"\"vecto
rs and instantaneous velocity. 'W' will wipe the vectors"
00160 PRINT "or 'C' will continue leaving vectors on screen."\"Answers to questi
ons must be within 2% of correct value."
00170 REM V0=Input Velocity        A0=Input Angle/57.29578
00180 REM Y0=Initial Velocity Up   X0=Initial Velocity Right
00190 REM H0=Input Height          G0=Input Gravity
00200 REM M0=Maximum Height        M1=Maximum X-value
00210 REM V1=Represent Y-velocity V7=Hit velocity
00220 REM P0,T0,T1,T2,T3 used to hold various times
00230 REM X1,Y1 hold position on x,y axes of projectile
00240 I=USR(32774)
00250 POKE 220,64 : ZONE 16 : CLS : PRINT \"Please input:-"\\"Angle (0-89)"\"Vel
ocity"\"Height (Default 0)"\"Gravity (Default 9.8)"
00260 CURS 32,4 : GOSUB 610 : A0=I1 : IF A0<0 OR A0>89 OR I0$="" THEN PLAY 24,2
: GOTO 260
00270 CURS 32,5 : GOSUB 610 : V0=I1 : IF V0<0 OR I0$="" THEN PLAY 24,2 : GOTO 27
0
00280 CURS 32,6 : GOSUB 610 : H0=I1 : IF H0<0 THEN PLAY 24,2 : GOTO 280 ELSE IF
I0$="" THEN CURS 34,6 : PRINT "0"
00290 CURS 32,7 : GOSUB 610 : G0=I1 : IF G0<=0 AND I0$<>"" THEN PLAY 24,2 : GOTO
 290 ELSE IF I0$="" THEN CURS 34,7 : PRINT "9.8" : G0=9.8
00300 G0=-G0 : A0=A0/57.29578 : Y0=V0*SIN(A0) : X0=V0*COS(A0)
00310 T1=-Y0/G0 : M0=H0+Y0*T1+.5*G0*T1*T1 : T2=SQR(ABS(2*M0/G0))
00320 T3=T1+T2 : M1=X0*T3 : V7=G0*T2
00330 PRINT \"Do you want the questions?";
00340 O7$=KEY : IF O7$="Y" THEN 350 ELSE IFO7$="" THEN 340 ELSE 420
00350 PRINT \"What is the maximum height reached by projectile?"\\"What is the d
istance travelled along the x-axis?"\\"What velocity does it have on landing?"
00360 CURS 1,11 : GOSUB 610 : CURS 16,11 : I2=M0/50
00370 IF I1<M0+I2 AND I1>M0-I2 OR (I1<M0+.2 AND I1>M0-.2) THEN PLAY 8;5;3;8 : PR
INT "Very good!!",M0 ELSE PLAY 3,3 : PRINT "The answer is ..."M0
00380 CURS 1,13 : GOSUB 610 : CURS 16,13 : I2=M1/50
00390 IF I1<M1+I2 AND I1>M1-I2 OR (I1<M1+.2 AND I1>M0-.2) THEN PLAY 8;5;3;8 : PR
INT "Good going!",M1 ELSE PLAY 3,3 : PRINT "The answer is ..."M1
00400 CURS 1,15 : GOSUB 610 : CURS 16,15 : I2=ABS(V7/50)
00410 IF I1<V7+I2 AND I1>V7-I2 OR (I1<V7+.2 AND I1>V7+.2) THEN PLAY 8;5;3;8 : PR
INT "Well done!",V7 ELSE PLAY 3,3 : PRINT "The answer is ..."V7
00420 PRINT \"Hit 'G' for graph, 'M' for motion picture or 'S' to start again";
00430 O6$=KEY : IF O6$="S" THEN 250 ELSE IF O6$="G" OR O6$="M" THEN 440 ELSE 430
00440 POKE 220,63 : CLS : HIRES : PRINT "Y-velocity      Time            X value
        Y value"
00450 T0=0 : P0=T3/64 : REM Scale time periods so there is 64 points
00460 X7=X6 : Y7=Y6 : X1=T0*X0 : Y1=(Y0*T0+.5*G0*T0*T0+H0)*.62
00470 IF X1>511 OR Y1>223 THEN 490
00480 SET INT(X1),INT(Y1) : X6=X1 : Y6=Y1
00490 IF O6$="M" THEN RESET INT(X7),INT(Y7)
00500 V1=Y0+G0*T0 : CURS 1,2 : PRINT V1,T0,X1,Y1
00510 IF KEY="I" THEN 530
00520 T0=T0+P0 : IF T0<T3 THEN 460 ELSE 240
00530 ON ERROR GOTO 540 : PLOT INT(X1),INT(Y1) TO INT(X1+X0),INT(Y1)
00540 ON ERROR GOTO 550 : PLOT INT(X1),INT(Y1) TO INT(X1),INT(Y1+V1)
00550 ON ERROR GOTO 560 : PLOT INT(X1),INT(Y1) TO INT(X1+X0),INT(Y1+V1)
00560 O7$=KEY : IF O7$="C" THEN 520 ELSE IF O7$="W" THEN 570 ELSE 560
00570 ON ERROR GOTO 580 : PLOTR INT(X1),INT(Y1) TO INT(X1+X0),INT(Y1)
00580 ON ERROR GOTO 590 : PLOTR INT(X1),INT(Y1) TO INT(X1),INT(Y1+V1)
00590 ON ERROR GOTO 600 : PLOTR INT(X1),INT(Y1) TO INT(X1+X0),INT(Y1+V1)
00600 GOTO 470
00610 PRINT [A32 32][A32 8]; : INPUT I0$ : I1=VAL(I0$) : RETURN
```

PROJECTILE MOTION

Projectile Motion is a physics simulation very useful for testing students in Years 11 and 12. It plots the trajectory, component vectors and instantaneous velocity for an object, and asks for maximum height, distance travelled and hit velocity. One dot on the screen is equal to one metre.

Richard Larkin
Dee Why, NSW

Sharp MZ700

MATHS EXERCISER

This program covers the four basic mathematical operations: addition, subtraction, multiplication and division. It is useful for primary schoolchildren and is complete with easy-to-follow instructions.

Tony Calciano
Bankstown, NSW

```
1 CLS:PRINT"MATH EXECISER by Tony Calcia
no"
2 PRINT"1=MULTIPLACATION"
3 PRINT"2=DIVISION"
4 PRINT"3=ADDITION"
5 PRINT"4=SUBTRACTION"
6 PRINT"WHICH WUOLD YOU LIKE TO PRACTICE
 FIRST"
7 INPUT X
8 IF X=1 THEN 10
9 IF X=2 THEN 170
10 IF X=3 THEN 330
15 IF X=4 THEN 480
20 PRINT"TYPE 2 NUMBERS BETWEEN 1-15 SEP
ERATED BY A COMMA"
30 INPUT A,B
40 PRINT"WHAT IS ";A;" * ";B;
50 INPUT X
60 IF X=A*B THEN 90
70 PRINT"NO,NO,NO--------THE ANSWER IS "
;A*B
80 GOTO 100
90 PRINT"FANTSTIC"
100 PRINT"WHAT ANOTHER ONE (YES=1)";
110 INPUT Y
120 IF Y=1 THEN 20
130 PRINT"WOULD YOU LIKE TO PRACTICE YOU
R DIVISIONS (YES=1) (NO=0)"
140 INPUT Y,N
150 IF Y=1 THEN GOTO 170
160 IF N=0 THEN 290
170 PRINT"TYPE 2 NUMBERS SEPERATED BY A
COMMA"
190 INPUT A,B
200 PRINT"WHAT IS ";A;" / ";B;
210 INPUT X
220 IF X=A/B THEN 250
230 PRINT"NO.....NO......NO.....THE ANSW
ER IS ";A/B
240 GOTO 260
250 PRINT"FANTASTIC"
260 PRINT"WANT ANOTHER (YES=1)";
270 INPUT Y
280 IF Y=1 THEN 170
290 PRINT"WUOLD YOU LIKE TO PRACTICE YOU
R ADDITION (YES=1) (NO=0)"
300 INPUT Y,N
310 IF Y=1 THEN 330
320 IF N=0 THEN 440
330 PRINT"TYPE 2 NUMBERS SEPERATED BY A
COMMA"
340 INPUT A,B
350 PRINT"WHAT IS ";A;" + ";B;
360 INPUT X
370 IF X=A+B THEN 400
380 PRINT"NO....NO....NO....THE ANSWER I
S ";A+B
390 GOTO 410
400 PRINT"TERREFIC"
410 PRINT"WANT ANOTHER (YES=1) (NO=0)"
415 INPUT Y,N
420 IF Y=1 THEN GOTO 330
430 IF N=0 THEN 440
440 PRINT"WOULD YOU LIKE TO PRACTICE YOU
R SUBTRACTION (YES=1) (NO=0)"
450 INPUT Y,N
460 IF Y=1 THEN 480
470 IF N=0 THEN 600
480 PRINT"TYPE 2 NUMBERS SEPERATED BY A
COMMA"
490 INPUT A,B
500 PRINT"WHAT IS ";A;" - ";B
510 INPUT X
520 IF X=A-B THEN 550
530 PRINT"NO....NO....NO....THE ANSWER "
;A - B
540 GOTO 560
550 PRINT"MARVELOUS"
560 PRINT"WANT ANOTHER (YES=1) (NO=0)"
570 INPUT Y,N
580 IF Y=1 THEN GOTO 480
590 IF N=0 THEN GOTO 600
600 PRINT"OK..SO LONG.............."
610 END
```

SORRY! The Gremlins got us. The correct phone number for DEKER BUSINESS MACHINES is 647-2744

```
00100 REM          SURROUND for the MICROBEE
00110 GOSUB 640 :REM instructions start
00120 REM Main Program Begins Here
00130 P=P : POKE P,7
00140 CURS 960 : PRINT" Score "S;
00150 CURS 980 : PRINT" High Score ":H;"  SURROUND";
00160 REM wait for key press
00170 A1$=INKEY$ : IF A1$="" THEN 170 ELSE POKE P,32
00180 REM  "AND" asc value to obtain upper case
00190 A = ( ASC ( A1$ ) AND 95 )
00200 REM get players new position
00210 IF A=72 : P = P - 64
00220 IF A=77 : P = P + 64
00230 IF A=75 : P = P + 1
00240 IF A=74 : P = P - 1
00250 IF A=79 : P = P - 63
00260 IF A=85 : P = P - 65
00270 IF A=78 : P = P + 63
00280 IF A=12 : P = P + 65
00290 REM if postion filled,  move back & reduce score
00300 IF PEEK(P)=191 THEN POKE P,7 : P=P : PLAY 1 : S= S-10: GOTO 340
00310 REM increment score & move to new position
00320 S=S+10 : POKE P,7 : CURS 960:PRINT" Score "S;
00330 REM computers move
00340 A = INT ( RND * 8 ) + 1
00350 FOR X = 1 TO A
00360   OUT2,184
00370     FOR G = 1 TO A
00380       OUT2,248
00390     NEXTG
00400 NEXTX
00410 IF Z(A) = 1 THEN 340
00420 IF A=1 :C=P-64 ELSE IF PEEK (P-64) = 191 :Z(1) =1 ELSE LET Z(1)=0
00430 IF A=2 :C=P+64 ELSE IF PEEK (P+64) = 191 :Z(2) =1 ELSE LET Z(2)=0
00440 IF A=3 :C=P-65 ELSE IF PEEK (P-65) = 191 :Z(3) =1 ELSE LET Z(3)=0
00450 IF A=4 :C=P+65 ELSE IF PEEK (P+65) = 191 :Z(4) =1 ELSE LET Z(4)=0
00460 IF A=5 :C=P+1 ELSE IF PEEK (P+1) = 191 :Z(5) =1 ELSE LET Z(5)=0
00470 IF A=6 :C=P-1 ELSE IF PEEK (P-1) = 191 :Z(6) =1 ELSE LET Z(6)=0
00480 IF A=7 :C=P-63 ELSE IF PEEK (P-63) = 191 :Z(7) =1 ELSE LET Z(7)=0
00490 IF A=8 :C=P+63 ELSE IF PEEK (P+63) = 191 :Z(8) =1 ELSE LET Z(8)=0
00500 Z(A)=1
00510 REM surrounded yet?
00520 U = Z(1)+Z(2)+Z(3)+Z(4)+Z(5)+Z(6)+Z(7)+Z(8)
00530 IF U=8 THEN POKE C,191 : PLAY 20,20 : GOTO 550
00540 IF PEEK(C) =191 THEN 340 ELSE POKE C,191 :GOTO130
00550 CURS0 : PRINT "GAME OVER     ";
00560 PLAY 0,20 : PRINT,," press Z to play again ",,
00570 REM  new high score?
00580 IF H   S THEN CURS 460 :PRINT " NEW HIGH SCORE "
00590 IF H < S : H=S
00600 A1$=INKEY$: X=(ASC (A1$) AND 95 ): IF X   90 THEN 600
00610 GOSUB 650
00620 GOTO 130
00630 REM INSTRUCTIONS / SET UP
00640 DIM Z(8) : A2$="" : H=2
00650 CLS: PRINT \\ TAB(24)  "SURROUND" \\ : A2$=""
00660 FOR X= 1 TO 7 : Z(X)=0 : NEXTX: S=0
00670 REM instructions
00680 PRINT,"I - Move Up"
00690 PRINT,"M - Move Down"
00700 PRINT,"J - Move Left"
00710 PRINT,"K - Move Right"
00720 PRINT,"O - Move Up & Right"
00730 PRINT,", - Move Down & Right"
00740 PRINT,"N - Move Down & Left"
00750 PRINT,"U - Move Up & Left"
00760 CURS960 : PRINT"Level of Difficulty 1 -100 ":
00770 REM      get correct value
00780 A1$=INKEY$:IF A1$ = "" THEN 780 ELSE IF A1$ = CHR$(13) THEN 820
00790 A2$ = A2$ + A1$
00800 IF LEN (A2$)   4 THEN 860
00810 PRINT A1$;
00820 GOTO 780
00830 D = INT(VAL (A2$))
00840 IF D   0 AND D   101 THEN 880
00850 REM   incorrect value,  clear bottom line try again
00860 PRINT" error ": : A2$="" :PLAY 11,2
00870 CURS 960 :PRINT [A60 32]; :CURS 0 : PRINT: GOTO 760
00880 A2$ = "" : CLS : LORES
00890 FOR X = 61440 TO 61503
00900    POKE X,191 : REM top line
00910    POKE X+896 , 191 : REM bottom line
00920 NEXTX
00930 FOR X = 61440 TO 62975 STEP 64
00940    POKE X,191 : REM left side line
00950    POKE X+63,191 :REM right side line
00960 NEXTX
00970 REM      fill in screen to level of difficulty
00980 FOR X = 1 TO D STEP 3
00990    A = INT (RND * 920 )+1 : REM random position
01000 POKE A+ 61440,191 :POKE A+ 61441,191 :POKE A+ 61442,191
01010 NEXTX
01020 P= 61660 + INT (RND * 500) + 1 : REM players starting position
01030 IF PEEK (P) = 191 THEN 1020 : REM position taken
01040 REM flash start position
01050 FOR X = 1 TO 4
01060  POKE P,7
01070   PLAY 0,4
01080  POKE P,134
01090   PLAY 0,4
01100 NEXTX
01110 RETURN
```

SURROUND

In a recent Pocket Program a contributor made the comment that too many POKEs confuse the Microbee. I thought the same, but I now realise it's the programmer's fault. You need to write correct code, especially when testing screen locations to see if they contain a certain character. An efficient way to do this uses an array to keep tabs on the contents of each location.

Surround is a game in which you move around the screen while the Microbee attempts to surround you. If you press the wrong key or attempt to move into a used position the Microbee has another go.

The best way to get a high score is to stay in one area of the screen as long as possible. The game ends when the Microbee surrounds you on eight sides.

The game could be adapted by adding mazes of increasing difficulty, PCG characters and sound.

Graham Upshall
Goulburn, NSW

Microbee

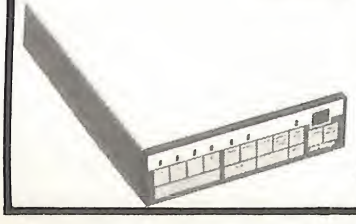
EARTH

Earth is one of my favourite programs. What you've got to do is fly the spacecraft up over the mountain, dock with the mothership to get food, then land (not too heavily). Easy, huh? Well, the mountain gets higher the better you get, a killer diamond shape appears and shoots at you (the nearer you are the more accurate it is), and if you survive that you'll find your landing ramp is situated in a canyon. The ship moves as a real one would if there were no air resistance. There is no down key, only gravity, so easy on the 'A' key.

Richard Larken
Dee Why, NSW

```
00100REM EARTH 4/7/83 RICHARD LARKIN.
00110POKE257,2:CLS:PRINT\\"Welcome to Earth!"\"Dock with mother."\"Land on ramp.
"\"To control ship use ',' '.' and 'A'"\"Any key to start...":I=USR(32774)
00120CLEAR:P2$="":Q1=.3:Z=3:O=0:S=0:POKE162,30:POKE163,128
00130F=100:V1=0:O=O+30:K=0:CLS:HIRES:FORN=-16TO-1:POKEN,0:NEXTN:A1=0:A2=-9.8:X1=
470:Y1=6:FORN=0TO5:PLOT 0,NTO511,N:NEXTN:IFO>90THENLETP2$="SHIP":Q1=Q1*.9:IFO>15
0THENLETO=150:Z=Z+1
00140FORN=1TOZ*3:X=INT(RND*53+9)*8:Y=INT(RND*12+4)*16:PLOT X+1,Y+3TOX+4,Y+3:PLOT
 X,Y+4TOX+5,Y+4:PLOT X,Y+5TOX+5,Y+5:PLOT X+1,Y+6TOX+4,Y+6:NEXTN
00150Q=INT(RND*FLT(O/2)+180-FLT(O/4)):W=INT(RND*FLT(O)+205-FLT(O/2)):E=INT(RND*F
LT(O/3)+310-FLT(O/6)):V2=1.5:R=INT(RND*FLT(O/2)+362.5-FLT(O/4))
00160T=INT(RND*FLT(O/2)+420-FLT(O/4)):FORN=0TO8STEP2:PLOT 180+N,5TOQ+N,O/4-N/4TO
W+N,O/2+O/5-N/2TOE,O-NTOR-N,O/2+O/3-N/2TOT-N,O/3-N/4TO440-N,5:NEXTN
00170PLOT 0,190TO56,190TO56,255:IFP2$="SHIP"THENPLOT E,OTOE+4,O+4TOE,O+8TOE-4,O+
4TOE,O:PLOT E,O+3TOE+1,O+4TOE,O+5TOE-1,O+4TOE,O+3:E1=FLT(E):O1=FLT(O)
00180R=INT(RND*300+150):T=O+INT(RND*20+20):FORN=3TO8:PLOT R+N,T+N-3TOR-N,T+N-3:N
EXTN:W=INT(RND*75+50):X=INT(RND*7+2):Q=INT(RND*6+8):FORN=WTOW+6+X:PLOT N,5TON,Q:
NEXTN
00190IFZ>10THENFORX=20TO24:PLOT W+X+Q*2,5TOW-10,X+14+Q:NEXTX
00200V3=FLT(INT(V2*10))/10:CURS1,2:PRINT"F="F" "\"X="V1" ":IFV3>.090RV3<-.09THEN
PRINT"Y="V3" "
00210X2=X1:Y2=Y1:V2=V2+.5*-9.8*.01:X1=X1+V1+V1:Y1=Y1+V2:X=INT(X2):Y=INT(Y2)
00220PLOTRX,YTOX+4,Y+4TOX,Y+4TOX+4,Y:X=INT(X1):Y=INT(Y1):N=(NOT(POINT(X,Y+5)ORPO
INT(X+4,Y+5))):IFPOINT(X,Y-1)ORPOINT(X+4,Y-1)THEN330ELSEIFX>502ORY>248ORX<50R(X<
61ANDY>134)THEN370
00230PLOT X,YTOX+4,Y+4TOX,Y+4TOX+4,Y:IFNTHEN240ELSEIFINT(V2)>20RX<R-20ORX>R+20OR
Y>T+40RY<T-5THEN350ELSEPLAY6;5;4;3;7:K=1:S=S+F:FORN=8TO3STEP-1:PLOTRR+N,T+N-3TOR
-N,T+N-3:NEXTN
00240IFP2$<>"SHIP"THEN280ELSEIFX<E+120ANDX>E-120ANDY>O-30THENINVERTE,O+4ELSE280
00250IFINT(RND*100)<100-ZTHEN280ELSELETW1=SQR(((X1-E1)*(X1-E1))+((Y1-O1)*(Y1-O1)
))
00260W1=W1*Q1:A=X+2+INT(RND*W1-W1/2):B=Y+2+INT(RND*W1-W1/2):IFB>250THEN280ELSEIF
POINT(A,B)THENLETF=F-INT(RND*3+1):IFF<1THENLETF=-100
00270PLOTIE,O+4TOA,B:PLOTIA-2,B-2TOA+2,B+2:PLOTIA-2,B+2TOA+2,B-2:PLAY24:IFF=-100
THEN340ELSEPLOTIE,O+4TOA,B:PLOTIA-2,B-2TOA+2,B+2:PLOTIA-2,B+2TOA+2,B-2
00280K1$=KEY:IFF<1THENLETF=0:GOTO200ELSEIFK1$=""THEN200
00290IFK1$=",","THENLETV1=V1+.5:F=F-1:FORJ=0TO1:FORN=2TO3:PLOTIX,YTOX-N,Y+1TOX,Y+2
:NEXTN:NEXTJ
00300IFK1$="."THENLETV1=V1-.5:F=F-1:FORJ=0TO1:FORN=6TO7:PLOTIX+4,YTOX+N,Y+1TOX+4
,Y+2:NEXTN:NEXTJ
00310IFK1$="A"THENLETF=F-2:V2=V2+.5:FORN=2TO3:PLOTIX+1,YTOX+2,Y-NTOX+3,Y:PLOTIX+
1,YTOX+2,Y-NTOX+3,Y:NEXTN
00320GOTO200
00330IFK=0ANDY>7ANDY<15ANDV2>-1.69ANDPOINT(X+4,Y-1)ANDPOINT(X,Y-1)THEN380
00340IFPOINT(X,Y-1)ANDPOINT(X+4,Y-1)ANDV2>-1.69ANDY>7ANDY<15THENPLAY1;2;3;5;8;11
:PRINT"LANDED":W=1:GOTO360
00350PLAY5,6:PRINT"CRASH!!":FORN=0TO10:PLOTIX,Y+2TOX+4,Y+2:PLOTIX+2,YTOX+2,Y+4:P
LOTIX+2,Y-2TOX+6,Y+2TOX+2,Y+6TOX-2,Y+2TOX+2,Y-2:NEXTN:F=0:Q=20
00360K=0:S=S+O/2+F/2:FORN=1TO500:NEXTN:CLS:PRINT\\\\"SCORE ="S\"Any key to conti
nue...";  :I=USR(32774):IFQ=20THENRUNELSE130
00370PRINT\\\\\TAB(24)"LEAVING SO SOON!!!!":Q=20:F=0:GOTO360
00380CURS2,9:PRINT"NO FOOD":FORN=1TO500:NEXTN:CURS2,9:PRINT"GO GET IT":FORN=0TO5
00:NEXTN:CURS1,9:FORN=1TO12:PRINTCHR(255);:NEXTN:V2=3:F=F+20:GOTO200
```


SCISYS SERIAL PRINTSHARE



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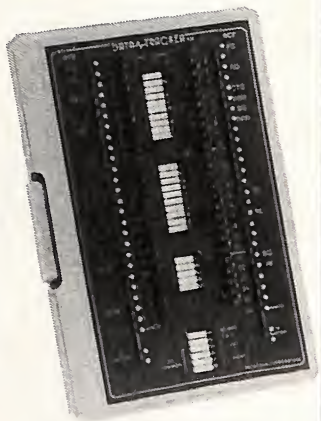

- ⋆ Compare RS-323 interfacing.
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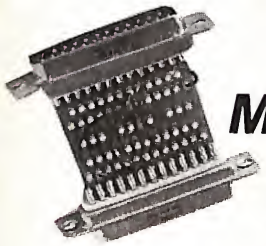
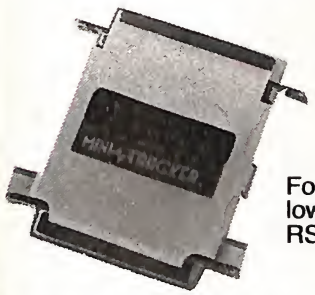


Micro Patch

For permanent on-site or workshop hard wire cabling without solder.



Mini Tracker

For visual indication of high and low signals on commonly used RS-232 pins, (2,3,4,5,6,8,11,20).

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Join a computer club or user's group. There's bound to be someone who's 'been there, fixed that problem', 'been there, written that program', 'been there, done that'.

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The maxim 'Publish or be damned' is still being taken literally by people in the computer world, but somewhere in the deluge there's sure to be the book you've been looking for. We'll be printing the barest details of every title we receive each month, and reviewing the most interesting at regular intervals.

Q & A_____93
Ask no questions, get no answers. We can probably help you with your computer-related problems. This month: Kaypro disk drive fault; Spectrum-to-Bulletin Board connection; why some Apple IIe programs don't run on the IIc

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Worth waiting for.

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Northern Territory: 8 Gardiner Street. Darwin 5790. Phone (089) 81 6204.

431NA

CLUB FILE

One of the best places to get information and help with a particular machine is through a computer user group or club. Such little pockets of wisdom are scattered throughout Australia, as you can see from this listing which we'll be publishing every couple of months.

Australian Capital Territory

ACT Micro 80 Users' Group, Bill Cushing, 10 Urambi Village, Kambah 2902, (062) 31 3630.
ACT VIC-20 Users' Association, Chris Groenhout, 25 Kerferd St, Watson 2602. Meetings first Monday each month at Boys' Grammar Scout Hall, Red Hill, 7.30 onwards. (062) 41 2316.
ACTARI, Chris McEwan, co-ordinator, ACTARI, PO Box E112, Canberra 2600, (062) 88 7861.
Apple User Group (ACT), Jeff Brock, 1 Buckley Circuit, Kambah 2902, (062) 31 3630.
Australian ZX80 Users' Group (AZUG), David Brudenall, 19 Godfrey Street, Campbell 2601; for ZX80/Microace owners.
Canberra ACT Sirius User Group, Jim Bland, (062) 81 2824, (062) 81 2832.
Canberra Compucolor Club (CCC), Meets 7.30 on first Sunday of every month at the offices of Digital Equipment, 28 Lonsdale Street, Braddon ACT.
Canberra Microbee Users' Group, Hugh Gibson, Microbee Store, Level 1, Cooleman Court, Weston 2611, (062) 88 6384.
Canberra Microbee Users' Group, Adrian Van Wierst, 9 McGowan Street, Dickson 2602, (062) 49 7030.
Canberra Micro-80 User Group, Milt Cottee, 33 Crawford Cres, Flynn 2615; meetings third Monday each month, 7.30 pm, in the small theatrette, Reid TAFE, for System 80, TRS80 and so on. (062) 58 8822.
Canberra NEC Users' Group, Mal Smith, PO Box 173, Belconnen 2616; meets first Tuesday each month at Main Conference Room, CSIRO Headquarters, Limestone Avenue, at 7.30. (062) 54 1614.
Canberra Osborne Group, c/o Geoff Cohen, PO Box 136, Kippax 2615, (062) 54 7608.
Micsig, Registrar, PO Box 446, Canberra 2601.
Sirius/Apricot User Group, M J Sim, 253 Hindmarsh Drive, Rivett 2611; meetings 7.30 pm third Tuesday each month, 88 Wollongong Street, Fyshwick 2609.

New South Wales

Albury-Wodonga District Microbee User Group, Eric Eulenstein, 202 Kooba St, Albury 2640, (060) 25 1601.
APF Users' Group, Norm McMahon, 288 Kissing Point Road, Turramurra 2074, (02) 44 2645
Apple Users' Disk Exchange Club, Peter Lapic, 45 Malabar Street, Canley Vale 2166.
Apple Users' Group, Colin Rutherford, PO Box 505, Bankstown 2200, meets 6.30 pm second Monday of each month (Tuesday after public holidays) at Sydney Grammar School, Stanley Street, Sydney (02) 520 0926
Atari Computer Enthusiasts, Tony Reeve, PO Box 4514, Sydney 2001
Ausborne, The Secretary, PO Box C530 Clarence Street, Sydney 2001, meetings third Wednesday each month at 6.30 pm in the North Shore Council Chambers, Cnr Miller and McLaren Streets, North Sydney 2060. (02) 95 5378.
Ausbug, Stephen Ford, PO Box 62, Londonderry 2753.
Australasian ZX80 Users' Group, Tony Mowbray, 87 Murphys Ave, Kieraville 2500, for ZX80/81 Microace owners. (042) 28 5296.
Australasian ZX80 Users' Newsletter, 87 Murphys Ave, Kieraville 2500.
BBC Educational Users' Group of NSW, Dick Cleary, PO Box 939, Darlinghurst 2010; meets 7.30 pm third Wednesday of each month at various locations.
Blue Mountains Microbee Computer Club, Roger Cooper, (047) 58 7238.
Blue Mountains Computer Club, Joe McKay, 25 Reserve Avenue, Blaxland 2774, (047) 39 3154.
Broken Hill Microbee Users' Group, Peter Cotter, 533 Radium Street, Broken Hill 2880. (080) 88 1621.
Central Coast Apple Users' Group, C W Lee, 662 The Entrance Road, Wamberal 2260; meetings first Tuesday each month at the Niagara Park Public School from 7.30 pm. (043) 84 3419.
Central Coast Computer Club, Max Maughen, PO Box 36, Ettalong Beach 2257, first and third Tuesday every month at Applied Technology, West Gosford, for all types of computer. (043) 24 2711
Commodore Users' Group, John Guidice, GPO Box 4721, Sydney 2001.
Compucolor Users' Group, Tony Lee, 52 Cowan Road, St Ives 2075, phone (02) 449 8824.
Cumberland Computer User Group, S O'Neil, (02) 682 3851.
DEC Personal Computer Special Interest Group, Marion Rhydderch, DEC Australia, Northern Tower, Chatswood Plaza, Railway Street, Chatswood 2067, (02) 412 5252.
Dubbo and District Microbee Users' Group, Coralie Taylor, 18 Cunningham Street, Dubbo 2830; meets fourth Wednesday each month at 7.30 pm in the Dubbo High School Computer Room.
Griffith Computer Association, Ron Gauci, PO Box 425, Griffith 2680, (069) 62 5877
Hawkesbury Commodore Computer Club, Richard Farrell, 12 Inverary Drive, Kurmond 2757, meets fourth Tuesday of each month at 7.30 pm at Neighbourhood Centre, West Market Street, Richmond 2753.
Hawkesbury Microbee Computer Club, Bruce Rennie, 6 Warks Road, Kurrajong Heights 2758; workshops 7.00 pm third Friday, and general meetings 7.30 pm first Friday of each month in the Microbee Network Room, Library Building, Richmond High School, Cnr Penrith and Lennox Streets, Richmond 2753. (045) 67 7329.
HP Desktop Computer Users' Group, Dr R W Harris, CSIRO Division of Mineral Physics, PMB 7, Sutherland 2232, (02) 543 3460.
Hunter Users' Group – All Microcomputers, Secretary, PO Box 39, Broadmeadow 2298; meets on the second Wednesday of each month in Room 308, Building W, University of Newcastle, at 7.45 pm. Membership is primarily Apple II oriented, but anyone with interest in micros welcome.
Illawarra Microbee Computer Club, Ronald Read, 49 Beatus Street, Unanderra 2526.
Illawarra Super 80 Users' Group, Jim O'Grady, Chairman, PO Box 1775, Wollongong 2500.
Kaypro Users' Group NSW, Harry Richards, 4/2 Bortfield Drive, Chiswick 2046; meets second Tuesday each month at 8.00 pm in the Burwood RSL. (02) 713 1585.
Macarthur Computer Association, I Napier, 23 Athel Tree Crescent, Bradbury 2560; meets first Monday each month at Airds High School, Briar Road, Campbelltown 2560, at 7.30 pm each month, all machines are catered for. (046) 25 2055
Macquarie Microbee Users' Group, Brian Thompson; meetings first Monday each month at Denistone East Primary School at 7.30 pm. (02) 85 1659 after hours
MEGS (Microcomputer Enthusiasts' Group), John Whitlock, PO Box 1309, Chatswood 2067, meetings third Monday each month at rear of St Andrew's Presbyterian Church, 37 Anderson Street, Chatswood 2067. (02) 638 1142
Microbee Users' Club (Broken Hill), Peter Cotter, 533 Radium Street, Broken Hill 2880. (080) 88 1621
Newcastle Microbee Users' Group, Lee Osman, 12 Cleverton Close, Warners Bay 2282. (049) 48 8813
Newcastle Microcomputer Club, Angus Bliss, PO Box 293, Hamilton 2303, meetings ▷

7.30 pm second and fourth Monday each month at Room G12, Physics Building, Newcastle Uni. (049) 67 2433.

NSW Primary School Microbee Users' Group, Mr Peter Stretton, c/-Hunters Hill Primary School, Alexandra Street, Hunters Hill 2110.

NSW 6800 Users' Group, 27 Georgina Avenue, Keiraville 2500.

Northern Beaches VIC User Group, E. Tuxford, 161 Barrenjoey Road, Newport 2106, (02) 997 2467.

Northern NSW MICC Chapter, Alen Hartley, Dundurrabin via Dorrigo 2433, (066) 57 8160.

NSW Peach User Club, Daniel Soussi; weekly meetings on Saturday from 2 pm at Cybernetics Research, 120-122 Lawson St, Redfern 2016. (02) 698 8286.

OSI Users' Group, Nigel Bisset, (02) 411 7142.

Pocket Computer Users' Club, George Antonijevic; for those interested in pocket computers, whatever the brand. Meetings held on the first Wednesday of each month at 7.30 pm at the Woodstock Community Centre, Church St, Burwood 2134, (02) 683 4296.

Sorcerer Users' Group, PO Box E162, St James 2000; meetings third Friday each month at 8.00 pm in Greenwich Community Hall, Greenwich Road, Greenwich 2065.

Southern Districts Commodore Users' Group, Lex Toms, 3 Lucille Crescent, Casula 2170; meetings first and third Wednesdays each month, API Hall, Currajong Road, Prestons 2170. (02) 602 8691.

Sutherland Super 80 Group, Jim Traeger, (02) 525 2018.

Sydcom 64 (C64 User Group), Andrew Farrell; meetings first Tuesday of each month at 6.30 pm above Computerwave, George Street, Sydney 2000. (02) 99 2640.

Sydney Forth Group, Peter Tregeagle, 10 Binda Road, Yowie Bay 2228; meets second Friday of each month at 7.00 pm in the John Goodsell Building, UNSW room LG19. (02) 524 7490.

Sydney Lotus 1-2-3 User Group, Ron Pollak, (02) 29 5316.

Sydney Microbee Users' Club, Colin Tringham, PO Box C233, Clarence St, Sydney 2000; meetings third Saturday each month 1-5 pm, Strathfield Girls' High School, (02) 92 6408.

Sydney Peach User Group, Ben Sharif, 261 Northumberland Street, Liverpool 2170, (02) 601 8493

Sydney TRS80 Users' Group, meetings second, third and fourth Saturday of each month at Botany. (02) 666 4716 bh.

TAG – The Access Group, Bob Dolton, PO Box 943, Orange 2800; for Access and Actrix users.

TI Sydney Home Computer Users' Group, PO Box 149, Pennant Hills 2120.

Wagga Microbee Users' Group, John Simmons, 47 Undurra Drive, Glenfield 2650; meetings first and third Tuesdays each month in the Tolland-Glenfield Neighbourhood Centre at 8.00 pm. (069) 31 1302.

Wizzard User Group, John Mifsod, 150 Bouganville Road, Blackett 2770, (02) 628 0801.

ZX-Spectrum Users' Club, Craig Kennedy, PO Box 466, Epping 2121.

Victoria

Apple Users' Society of Melbourne, D Halprin, PO Box 43, Forest Hill 3131, (03) 387 3221.

AT Microcomputer Club, Grant Forest; this club has been formed for people interested in the Applied Technology DGOS Z80; (03) 879 2257 ah, (03) 699 2888 bh.

Atari User Group Melbourne, Kelvin Eldridge, PO Box 173, Reservoir 3073.

Australian Forth Interest Group, Tony Latermore, PO Box 704, Sale 3850, (051) 44 2011.

Australian North Star Users' Association, PO Box 194, Wangaratta 3677.

Ballarat Computer Users' Group, Publicity Officer: John Preston, (053) 31 4363.

Billanook Computer Forum, Maurie Canterbury, Cardigan Road, Mooroolbark 3138, (03) 725 5388.

BUG 80 (Burwood Users' Group), PO Box 46, Blackburn South 3130.

Chip 8, 6800, 1802 User Group, Frank Rees, 27 King Street, Boort 3537.

Compucolor Users' Group, L Ferguson, 12 Morphett Avenue, Ascot 3342.

DEC Personal Computer Special Interest Group, see NSW entry.

Forth Interest Group, Lance Collins, PO Box 103, Camberwell 3124; meets on the first Friday of the month at the Bowen Street Neighbourhood Centre, 102 Bowen Street, Camberwell South 3124. (03) 29 2600.

Geelong Commodore Computer Club, D Gerrard, 15 Jacaranda Place, Belmont 3216, (03) 44 2863.

Geelong Computer Club, Peter McKeon, PO Box 93, Geelong 3220.

IBM & Columbia Computer Users' Club, Giles Bray, 22/11 Auburn Grove, Hawthorn East 3123; meets second Tuesday each month, 7.30 pm, at the Victorian College of Pharmacy, (03) 82 7632.

Kaypro Users' Group of Victoria, George Kunz, PO Box 159, Forest Hill 3131; meetings fourth Sunday each month at Burwood State College Community Resources Centre at 2 pm. (03) 857 5462.

KAOS (Ohio Scientific), David Anear, 49 Millewa Crescent, Dallas 3047.

Latrobe Valley Colour Computer Users' Group, George Francis, 31 Donald Street, Morwell 3840; for TRS80 and MC10 users. (03) 22 1389.

Melbourne Atari Computer Enthusiasts, PO Box 133, Mulgrave North 3170; meetings held on first Sunday of each month at 11.40 am at Monash University Rotunda.

Melbourne Lotus 1-2-3 Users' Group, Robert Taylor, (03) 267 4800.

Melbourne Microbee Users' Group, President: Grant Forrest, PO Box 157, Nunawading 3131; meetings 7.00 pm second Wednesday each month at Victorian State College – Burwood Campus, 221 Burwood Highway, Burwood 3125.

Melbourne PC User Group, Stephen Wagen or Christopher Leptos, c/o Pannell Kerr Foster, 14th Floor, 500 Bourke Street, Melbourne 3000, (03) 605 2222 bh.

Melbourne Peach Users' Group (MPUG), P.O. Box 191, Rosanna 3084, (03) 434 2541.

Melbourne Super 80 Users' Group, Hon. Sec. Victor Shuttleworth, (03) 723 2713.

MICOM (Microcomputer Club of Melbourne), PO Box 60, Canterbury 3126.

National Mutual Micro Users' Group, R Prewett, NMLA, PO Box 2830AA, GPO Melbourne 3001; for National Mutual staff.

National Sinclair User Group, PO Box 148, Glen Waverley 3150.

National ZX80 Users' Club, 24 Peel Street, Collingwood 3066.

NEC Portable Users' Group, D Green; meetings second Wednesday of each month at Myers Computer Centre, Lonsdale Street, at 7.30 pm. (03) 611 3380.

Northern/Western Suburbs Computer Users' Group, John King (Secretary), 284 Union Road, Moonee Ponds 3039. Contact CP/M Data Systems, (03) 338 9304.

Peninsula Computer Club, George Thompson, 3 Patterson Street, Bonbeach 3196; meets second Tuesday each month at Chisholm College, Frankston 3199; many types of computers catered for. (03) 772 2674.

Sharp Computer Users' Association, The President, 7 Faye Street, East Burwood 3151.

Spectravideo Users' Group, Mitch Raitt, 3 Clivejay Street, Glen Waverley 3150, (03) 233 2357.

Sorcerer Computer Users' (Australia), Secretary, GPO Box 2402, Melbourne 3001.

TI-99/4A Users' Group Melbourne, Wayne Worladge, 123 Ashburn Grove, Ashburton 3147, (03) 25 1832.

The Motorola User Group (MUGS), Clive Allan, 11 Haros Avenue, Nunawading 3131; group is interested in 6800/02/09-based computers, particularly if running Flex, although this is not a prerequisite to join. (03) 878 1298.

Victorian Association of Computer Educators, Arthur Totrall, PO Box 69, Whittlesea 3757

Have you changed your club address? The meeting place? The contact number? Let us know.

The accuracy of this listing depends on updates from club organisers. Ring Evan McHugh on (02) 662 8888, or write to us ...

Victorian Osborne Users' Group, Scott Samuel, PO Box 169, Camberwell 3124, (03) 232 0822.
Victorian VZ-200 User Group, Luigi Chiodo, 24 Don St, Reservoir 3073, (03) 460 3770.
Victorian Wizzard Users' Group, Barry Klein, 24 Russell Street, Bulleen 3105.
Yarrawonga Computer User Group, Chris Younger, 10 Witt Street, Yarrawonga 3730, (057) 44 385; for all machines.
ZX81 Software Exchange, c/-Chips Taens, 5 Muir Street, Mount Waverley 3149.

Queensland

Adventure Club, Christine Ogden, 37 Samford Road, Leichhardt, Ipswich 4305; for all Adventure-type game players.
Apple-Q – The Brisbane User Group, The Secretary, PO Box 721, South Brisbane 4101; meetings every third Sunday of month at Hooper Education Centre, Kuran Street, Wavell Heights 4012. Centre is open from 8.30 am till 4.30 pm; members encouraged to bring Apple along.
Australian Sirius Users' Group, PO Box 204, Chermside 4032; looks after the needs of Sirius One and Victor 9000 computer users; (07) 350 2611.
BASIC User Group, Chris Lucey, Cranium Computers, 34 Lawless Street, Blackwater 4717.
Brisbane Medfly Users' Group, K I Walker, 120 Highgate Street, Coopers Plains 4108.
Brisbane Sinclair (Spectrum) Computer Club, V Lewis, 37 Samford Road, Ipswich 4305; meets third Sunday at Everton Park State High School, at 2.00 pm. (07) 355 7809.
Brisbane Super 80 Users' Group, Gary Gatfield, (08) 355 3173.
Brisbane Youth Computer Group, A Harrison, PO Box 396, Sunnybank 4109.
Cairns District Microbee Users' Group, Chas Eustance, 21 Marr Street, Edmonton 4869, (070) 55 4531.
Commodore Computer Users' Group Queensland, Mrs D D Dillan, PO Box 127, Stones Corner 4120.
Commodore Users' Group, John Egan, PO Box 274, Springwood 4127, for owners of Pet/CBM and VIC-20 machines. Meetings held on the first Tuesday of the month at 130 Petrie Terrace, Brisbane 4000. (07) 287 2705
Computer Owners' Group, Betty Adcock, 42 Lucan Ave, Aspley 4034, meets second Wednesday each month, 7 45 pm, all kinds of computer are catered for (07) 263 4268
DEC Personal Computer Special Interest Group, see NSW entry
Gold Coast Microbee User Group, Col McLaren, 1 100 Imperial Parade, Labrador 4215; meetings first Sunday each month, 3 00 pm, at the Southport High School (075) 31 4610
IREE Microcomputer Interest Group, N Wilson, PO Box 811 Albion 4010
Mackay Microbee User Group, Geoff Gehring, PO Box 230, Mackay 4740, (079) 42 3214.
Osborne Users' Group of Queensland Uni, Glen McBride; meetings second Thursday each month, open to all. (07) 371 4243.
Superboard Users' Group, Ed Richardson, 146 York Street, Nundah 4012.
Tandy, Apple, Commodore User Group, Chris Lucey, 34 Lawless Street, Blackwater 4717.
The Microcomputer Society, The Secretary, PO Box 580, Fortitude Valley 4006; meetings are held on the second Friday of each month in the Old Town Hall, corner Vulture and Graham Streets, South Brisbane 4101. Meetings start at 7.30 pm; if main gate is closed use the back stairway.
Townsville Microbee User Group (TMUG), Mannie Van Rijswijk, PO Box 5751 MC, Townsville 4810; meetings 7.30 pm on second and fourth Mondays each month on the Ground Floor, St Margaret Mary's Secondary School, Crowle Street, Hermit Park 4812.
TRS80/System 80 Computer Group, Secretary, 16 Laver Street, Macgregor 4109; meets first Sunday each month at Lindum Hall, Lindum Street, Lindum 4178, at 2.00 pm. (07) 343 5771.
VZ-200 Pacific Region Club, I D'Alton, 39 Agnes Street, Toowong 4066, (07) 371 3707.
ZX81 Club, P Carswell, 22 Braud Street, Bundaberg 4670.

South Australia

Adelaide Atari Computer Club (AACC), Secretary, PO Box 333, Norwood 5067; meets at Gilles Street Primary School, City, on first Monday (second if first is on public holiday) of each month.
Adelaide Lotus 1-2-3 User Group, Paul Wragg, Pannell Kerr Foster, GPO Box 1969, Adelaide 5001
Adelaide Micro User Group, R G Stevenson, 36 Sturt Street, Adelaide 5000; for TRS80 and System 80 users
Adelaide Osborne Group, Russell Barter, The Secretary, 410 Regency Road, Prospect 5082
Beebnet, BBC and Econet User Group PO Box 262, Kingswwod 5062; the group intends to produce a newsletter on a monthly basis. It is interested in any software producers or distributors who would be interested in serving the group's market requirements.
Commodore/VIC Computer Users' Association, Mr Eddie Hann, 13 Miranda Road, Paralowie 5108; the SA branch meets monthly.
Compucolor-Intecolor Users of South Australia, PO Box 86, Torrensville 5031, (08) 352 3296.
DEC Personal Computer Special Interest Group, see NSW entry.
IBM-PC South Australia Users' Group, PO Box 68, Walkerville 5081.
Kaypro User Group, Ralf Engler, 16/34 John Street, Payneham 5070.
Microbee Users' Group of South Australia (MUGSA), The Secretary, GPO Box 767, Adelaide 5001.
South Australian Commodore Computers' User Group, Eddie Hann, Secretary, PO Box 427, North Adelaide 5006; meetings second Tuesday each month, 7.30 pm, at Royal Caledonian Hall, 379 King William St, Adelaide 5000. (08) 258 6367.
South Australian Foundation for Computer Literacy, Michael Kennett, PO Box 210, Norwood 5067; caters for children from six years (unaccompanied) or four years with older friend or brother or sister. Special emphasis on the needs of handicapped, educably disabled and socially disadvantaged children, but *all* children welcome. Family participation encouraged. (08) 51 5474.
South Australian Peach User Group, Geoff Drury, 27 Creslin Tce, Camden Park 5038; special interest group attached to the SA Microprocessor Group, which holds separate meetings. (08) 352 2555 bh or (08) 295 2778 ah.
South Australian Microprocessor Group Inc (SAMG), The Secretary, PO Box 113, Plympton 5038, (08) 278 7288
Sorcerer Users' Group of South Australia, Don Ide, 14 Scott Road, Newton 5074.
South Australian Apple Users' Club, The Secretary, c/-The Bookshelf, 169 Pirie Street, Adelaide 5000.
South East Computer Enthusiasts' Group, Glenn Mibus, 3 Millard St, Mount Gambier 5290; meetings second and fourth Tuesday of each month from 6.30 pm at Mt Gambier High School Computer Room, for all machines and interested parties (087) 25 1046.

Northern Territory

Alice Springs Microbee Users' Group, Douglas Craigie, c -PO Box 3230, Alice Springs 5750
Darwin Microbee Users' Group (DBUG), Felino Molina, PO Box 3111, Darwin 5794 (089) 82 5613 bh, (089) 88 1455 ah ▷

commodore 64

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CLUB FILE

Northern Territory Computer Club, Ian Diss; meets at Wulagi Primary School on the first and third Thursday of each month at 7.30 pm. Users of all machines and other interested parties welcome. (089) 27 9208.
Northern Territory 80 Computer User Group, R T O'Brien, 433 McMillans Road, Jingili 5792.
The Microcomputer Association of the Northern Territory, Andy Smith, Darwin Community College, Casuarina 5792.
VZ-200 Users' Club, 7 Abbott Crescent, Malak 5793, (089) 27 2830.

Western Australia

Agriculture Users' Group, c/-Mr R Fenwick, Dept. of Agriculture, Albany 6330. For farmers and the agriculture service industries.
CU West WA Compucolor/Intecolor Users' Group, John Newman, 8 Hillcrest Drive, Darlington 6070.
DEC Personal Computer Special Interest Group, see NSW entry.
KAOS-WA, Gerry Ligtermoet, 39 Cloister Ave, Manning 6152; for Ohio Scientific Users. (09) 450 5081.
Kaypro User Group of Western Australia, Ainslie Sharpe, PO Box 91, Claremont 6010; meetings second and fourth Mondays of each month in the Canteen of the Department of Agriculture, Jarrah Road, South Perth 6151. (09) 384 5511.
Microbee Users' Group of Western Australia, The Secretary, 4 Garnkirk Road, Greenwood 6024, (09) 447 5366.
OSWEST-Osborne Users' Group of Western Australia, Mal Ferguson, PO Box 199, Mundaring 6554; meets first and third Wednesdays at the Palmyra Recreation Centre and the Subiaco Exhibition Hall respectively from 7.30 pm, for Osborne and other interested computer users. (09) 295 1449.
Perth 80 Users' Group, C Powell; for System 80 and TRS80 users. (09) 457 6849.
Perth Hitachi Peach Club, The Secretary, 1 Charf Court, Riverton 6155; for Hitachi Peach and 6809s. (09) 367 5880.
Sharp PC Users' Group, John Paulic, PO Box 79, Gosnells 6110, (09) 398 6303.
Sorcerer Computer Users of Australia, The Secretary, 90 King George Street, South Perth 6151. (09) 367 6351.
Super 80 Users' Group Perth, Garry Black, 19 Bendigo Way, City Beach 6015, (09) 385 8813.
The West Australian Atari Computer Club, Mr Alf Gaebier (Secretary), PO Box 7169, Cloisters Square, Perth 6000.
VIC-Ups, G. Padfield, (09) 451 4629.
Western Australian Wizzard Users' Group, John Reid, 13 Wenlock Road, Wattleup 6166, (09) 410 2359.
Western Australian ZX Users' Group, Phil Taylor, (09) 328 4111 bh.
Western Australian University Computer Club, 2nd Floor, University of WA, Guild Building, (09) 386 1455.

Tasmania

DEC Personal Computer Special Interest Group, see NSW entry.
Devonport Computer Interest Group, John Steveson, RSD 422, Sheffield 7306, (004) 92 3237.
Spectravideo Computer Users' Group, Mr W P Decket, 48 Heather Street, Launceston 7250; membership costs $15, which entitles members to a newsletter and to discounts on computer equipment. (003) 44 4836.
Tasbeeb, John Hannon, PO Box 25, North Hobart 7000; meetings first Monday each month at Elizabethan Matriculation College in D Block at 8 pm, for BBC computers. (002) 34 2704.
Tasmanian TI User Group, Co-ordinator, 1 Benboyd Court, Rokeby 7019; meetings third Sunday of each month at University of Tasmania, room 373. (002) 29 4009.
TAS-Micro, Peter Deckert, 1/456 West Tamar Road, Riverside 7250.
Tasmanian Commodore Users' Association, Vincent Staggard, Secretary, GPO Box 391D, Hobart 7001, Commodore and others. (002) 72 0295.
Tasmanian OSI User Group, David Tasker, 111 Bass Highway, Westbury 7303.

New Zealand

1802 Users' Group, PO Box 6210, Auckland, New Zealand; for those who own an ETI-660 or a Cosmac VIP; please send a return addressed envelope and International Reply Coupon.
Nelson VIC Users' Group, Peter Archer, c/-PO Box 860, Nelson, New Zealand; for VIC and Commodore 64.
Wellington Microcomputer Society Inc, Lindsay Williams, 2 Pope Street, Pimmerton, New Zealand.
ZX81 Club, R Skelton, c/-Harbourside Orchard, Waiuku, New Zealand.

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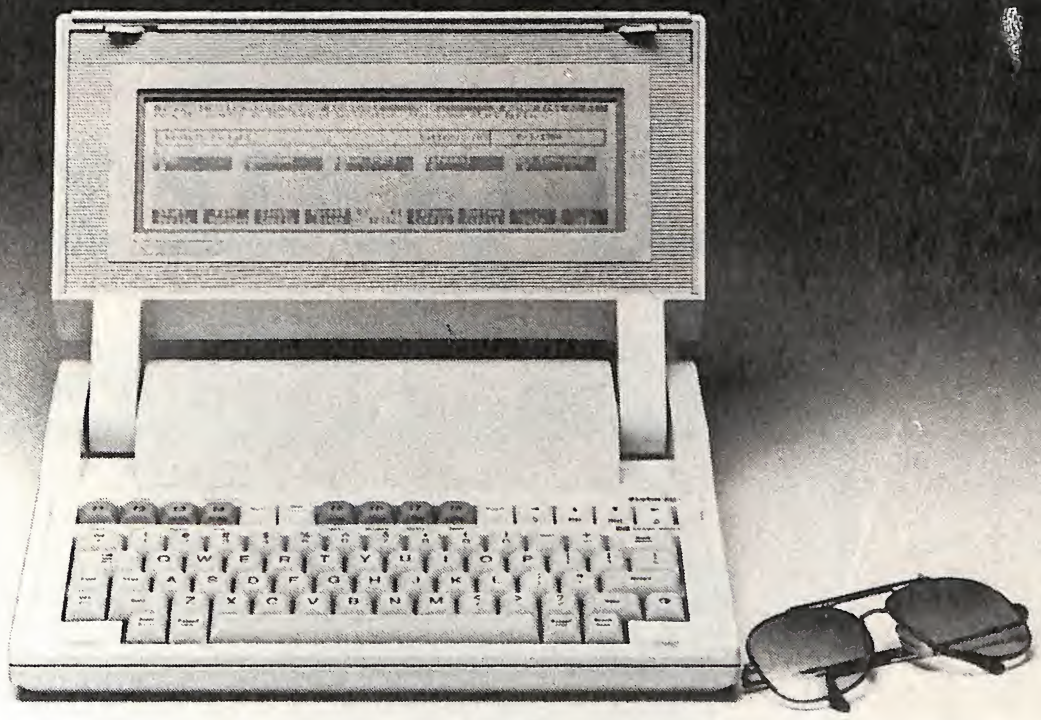

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BOOKS IN BRIEF

So many books on computing are being released in Australia these days, it's impossible to review them all. However, we'd hate you to miss out on the one book you've been after for years just because 'Your Computer' hadn't told you it was available, so each month we'll be running this brief summary of the latest releases.

GENERAL

Illustrated Guide to the Macintosh
Ken Uston
Spectrum (Prentice-Hall), $15.95.
If you don't have the time to wade through the Macintosh manual, former stock market vice-president and blackjack professional Ken will get you going in under an hour.

Mastering Your Macintosh
William Skyvington
Prentice-Hall, $25.50.
This book introduces the unique concepts of Macintosh use and explains the key software associated with it.

The Atari 800XL: A Practical Guide
Thomas Blackadar
Sybex (ANZ), $18.95.
A guide for the novice that helps you set up the computer and start writing programs or using commercial software.

Science Computer Programs for Kids and Other People
Tom Speitel, Mike Rook, Khan Pannell, Cornelia Anguay, Danny Speitel
Prentice-Hall, $9.95.
Simple programs teach children a number of basic science concepts.

BASIC Without Maths
Charles Platt
Zomba Books (George Allen and Unwin), $10.95.
An introduction to BASIC programming with no maths until Chapter 7.

The Complete Synthesiser Handbook
Michael Norman and Ben Dickey
Zomba Books (George Allen and Unwin), $11.95.
A book for computerists/musicians that looks at synthesisers and their growing relationship with computers.

Astounding Arcade Games for the John Sands Sega
Darren Love and Guy Hancock
Interface Publications (Pitman), $3.95.
Three games for the versatile Sega: Orcron Invasion, Astro-Diver and The Spacey Dog Squad.

The Amstrad Games Book
Mark Ramshaw
Pitman Publishing, $14.95.
A book of 30 arcade, maze and adventure games.

Structure and Interpretation of Computer Programs
Harold Abelson, Gerald Jay Sussman and Julie Sussman
MIT Press (Book and Film Services), $57.50.
A highly technical yet interesting and informative look at some of the fundamental concepts of software design.

BBC

Networking with the BBC Microcomputer
R G Napier
Prentice-Hall, $14.95.
This book was written by one of the key people in the development of the powerful Econet local area network, and explains its operation.

BBC Micro: Music Masterclass
Ian Ritchie
Pan, $16.95.
A guide to programming the BBC for music, with numerous example programs.

Cracking the Code on the BBC Micro
Benni Notarianni
Pan, $17.95
An introduction to machine code programming on the BBC, with a number of valuable routines included.

COMMODORE

The Commodore 64 Music Book
J Vogeland and N B Scrimshaw
Shiva (ANZ), $19.50.
A guide to the use of the Commodore 64 in producing music, with sample routines that produce music and sound effects.

Cracking the Code on the Commodore 64
John Gibbons
Pan, $17.95.
An introduction to assembly language, with tips on good programming practice and tricks to use to improve the performance of the Commodore.

Keeptrack File Manager for Personal Computers
Norm Church
Dilithium Press (ANZ), $17.95.
A guide to the Commodore list manager, Keeptrack, also available through the publishers.

Keeptrack Reporter
Norm Church and Bruce Schneider
Dilithium Press (ANZ), $17.95.
A follow-up to the 'Keeptrack' book referred to above, explaining how to produce reports and labels from Keeptrack files.

Learning Logo on the Commodore 64
Anne McDougall, Tony Adams and Pauline Adams
Pitman Publishing, $15.95.
A thorough guide to using Logo on the Commodore, with instruction, examples, projects and experiments.

Invaluable Utilities for the Commodore 64
Clive Emberey and Bob Turner
Pan, $16.95.
A number of programming aids that build into a powerful extension to the 64's BASIC.

Let's Talk Commodore Turtle
Liddy Nevile and Carolyn Dowling
Prentice-Hall: $15.95 for Teachers' and Parents' Edition, $5.95 for Kids' Edition.
A pair of books with large print for kids and smaller print for adults. The teachers' and parents' edition explains the concepts that each exercise is trying to build and what should be expected from the child.

Panther Extended BASIC for the Commodore 64
Ross Symons
Interface Publications (Pitman), $4.95.
A book that gives the listing and instructions for a program that extends the graphics, interface and programming tools of the Commodore 64.

PUBLISHERS AND DISTRIBUTORS

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7 Grosvenor Place, Brookvale 2100; (02) 939 1333.
George Allen and Unwin
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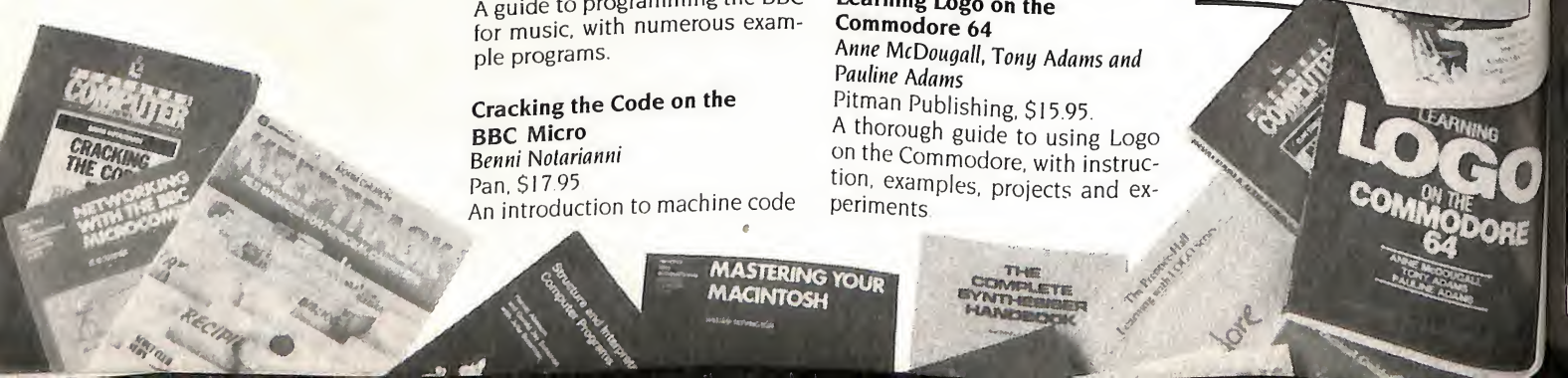
ANZ Book Company
10 Aquatic Drive, Frenchs Forest 2086; (02) 452 4411.
Pitman Publishing
158 Bouverie Street, Carlton 3053; (03) 347 3055.
Book and Film Services
Unit 3B Artarmon Industrial Estate, Corner Frederick Street and Reserve Road, Artarmon 2064; (02) 439 6155.
Pan Books
68 Moncur Street, Woollahra 2025; (02) 32 9952.



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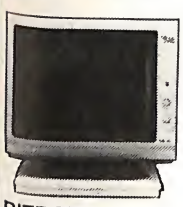

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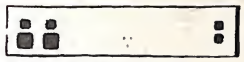

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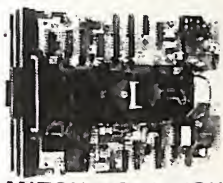

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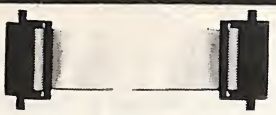

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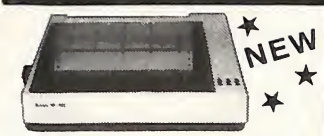

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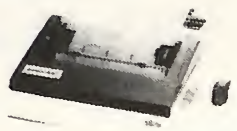

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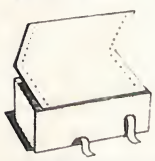

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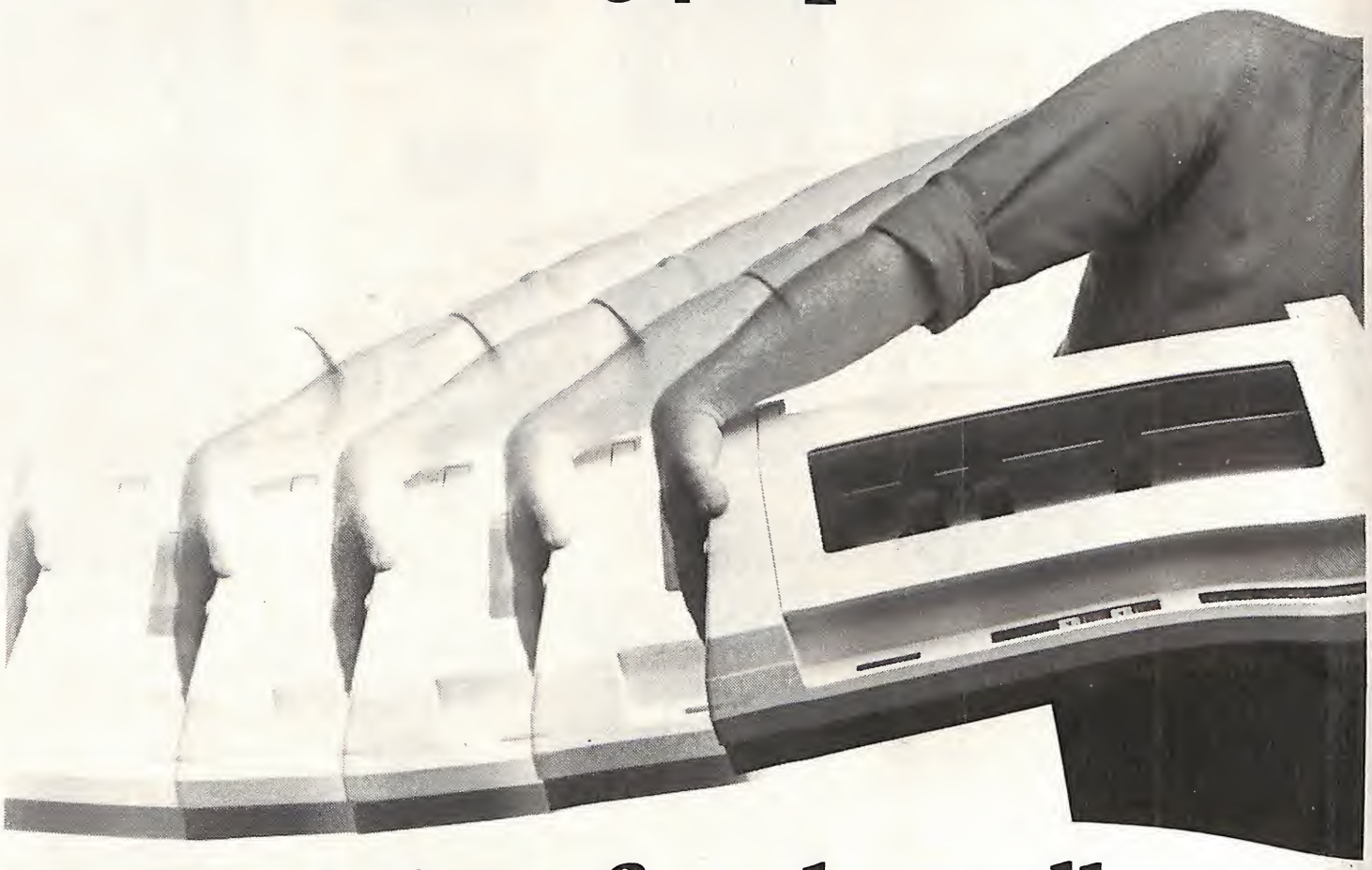

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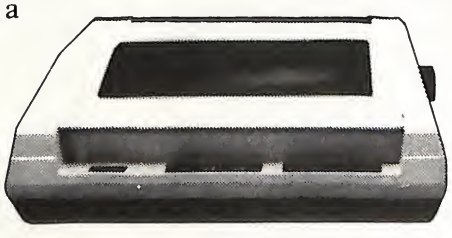

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BY JOHN NICHOLLS

LOTUS HOTLINE

Help

WHEN YOU LOAD Symphony, one of the screens pauses to allow you to change from the program disk to the Help disk (this is in a system using floppy disks, of course). You do not have to change disks at this point; you can change them at any time. The Help files are stored on the disk and are not moved into RAM (random access memory) until you call on them. If you invoke help when the Help disk is not in Drive A the usual result is an error message, although I have heard of some systems 'hanging' in these circumstances. ('Hanging' means the computer comes to an abrupt stop and none of the keys work. Resetting the computer is the only solution, but this generally means you lose all work in progress – another argument for saving work to disk at frequent intervals.)

User Groups

Branches of the Lotus Users' Association (formerly the Lotus 1-2-3 Users' Association) are now established in each of the mainland state capitals. This is the first known Australian group for a software product, as opposed to a hardware users group. Australia-wide the association has more than 600 members.

Printer Drivers

A new set of printer drivers for Lotus 1-2-3 will be available in April. The effect of the change will be to make the drivers the same as for Symphony. Your dealer will have details.

Most people will find that their printer or plotter appears on the list of Lotus printer drivers. Do not despair if yours doesn't. Some printers emulate other printers, so if there isn't a driver specifically listed for your printer, check your printer manual to see if the printer emulates one of the machines for which Lotus supplies a driver.

Jazz

Lotus will soon be releasing a program called Jazz for the Apple Macintosh. Essentially this will be the same as Symphony, but it will be modified to conform with the very different user interface of the Macintosh.

IBM PCjr

A cartridge containing Lotus 1-2-3 has been announced by Lotus for the PCjr, and may be available in Australia by the time you read this. The PCjr with 1-2-3 requires a number of add-ons to make it work, but the end result may be cheaper than a conventional PC running the disk version of 1-2-3. A feature article in the November issue of the *Lotus Users' Association Newsletter*, written by Don McKenzie, gives full details of the PCjr/1-2-3 combination.

Book Review

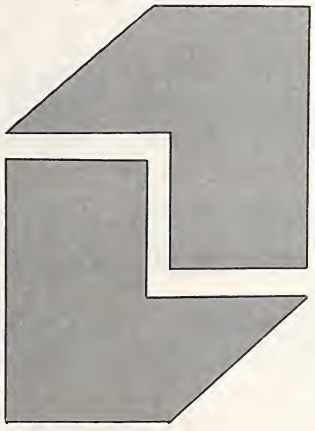
Coming to grips with such a comprehensive program as Symphony is difficult. Some even go so far as to claim that Symphony may be too complex for the average PC user. This isn't true, simply because you find that for most applications you need to use only a small part of Symphony's capabilities you are interested in, without worrying about the others.

This approach is followed in a book called *Mastering Symphony*, written by Douglas Cobb and published by Sybex. In the introduction Cobb states, "There is simply too much to learn for you to expect to master Symphony in a few days or even a few weeks. In fact, you'll probably never memorise all of Symphony's commands, functions and other features. There is just too much to hold in your head at the one time."

The book is designed as a tutorial and as a reference guide. The tutorial starts with the use of Symphony as a spreadsheet, and goes on to more advanced topics such as windowing and to the other elements of Symphony – word processing, graphics, data base management and data communications. The detailed table of contents and extensive index also make it a useful reference guide. In this respect the book is more usable than the Symphony documentation, which is fragmented over several volumes.

Mastering Symphony is well-written and clearly expressed, with plenty of examples and illustrations. The style is friendly and colloquial without being patronising. For someone who really wants to master Symphony and has the time to read through and study the book, it is highly recommended. It can also be recommended to anyone as a better reference guide to Symphony than others currently available.

The only disadvantages of the book are its size and cost. Its page size is the same as the Symphony manuals (175 mm x 227 mm), but including the index it runs to 763 pages! This is one big book. The recommended retail price is $49.95 – not unreasonable for a book of this size. It is distributed here by ANZ Book – of 10



Aquatic Drive, Frenchs Forest 2086 – and should be available at computer stores and bookshops. The Sydney Lotus Users' Association was able to arrange for members to receive copies at a discount, so it would be worthwhile checking to see whether this offer still applies.

Mouses (Mice?)

The October 1984 issue of *Byte* magazine contains an article entitled 'Using a mouse with Lotus 1-2-3'. This article contains a program that converts input from a Microsoft mouse to simulated keyboard input for an IBM PC. The author claims it is faster to move the cursor with the mouse than with the arrow keys. Another advantage is of course that you can leave the Num Lock set, use the keypad for data entry and use the mouse for moving the cursor.

I have heard of several people trying unsuccessfully to use a Microsoft mouse with 1-2-3. I would be interested to hear from anyone who has had success in using any sort of mouse with this package.

1-2-3 on DEC Computers

There was a misprint in the January Operating System column. The update from DOS 2.01 to DOS 2.05 applies only if the system disk is dated after March 2 1984, not before as stated.

The only version of DOS for the DEC machines currently being produced is version number 2.05. At DEC's request, Lotus has changed the disk format to accommodate Rainbow DOS 2.05. Version 2.05 cannot be installed onto any 1-2-3 system disks dated prior to March 2, 1984. It is possible to update DEC files from DOS 2.01 to DOS 2.05 which is to be used in conjunction with the latest version of 1-2-3, for a cost of $25 per disk. □

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Q AND A

Technically speaking, we're sure you've got lots of questions you'd like to ask us. In practice, we think we can help. Write to Evan McHugh, Q&A, 'Your Computer', PO Box 227, Waterloo 2017. You should get an answer in the mail within a couple of weeks. After another month or so we'll publish your query for the benefit of others.

KAYPRO DISK QUANDARY

I am having trouble with my Kaypro II and I wonder if any other users are having the same problems.

Right in the middle of a letter (using Perfect Writer) or a BASIC program (using MBASIC), there suddenly appears the message 'BDOS error on Drive B: R/O', and of course when I hit the next key, the whole lot reverts to a warm boot.

No! I have not changed the diskettes in either drive, and it happens at least once every four hours (of continuous work), sometimes more.

When copying, or even preparing *blank* disks for future use, the B drive makes a terrible knocking sound, which continues over about ten or 20 tracks. I have had it continue into the next disk, and then not happen for another couple of days.

Of course, when I take the Kaypro to the company that sold it to me, the drive is as quiet as the proverbial church-mouse, and the salespeople tell me it's my imagination and/or that it's normal for the drives to do this.

Once a friend was there when the knocking started and shone a torch in through the closed drive door. He could see the drive flopping about, which it should not do, but when it was 'uncovered' at the display centre for the technician, it was not loose. Has *anyone* else had this happen, and if so, is there an explanation, or a solution please?

D.A. LAVARACK
Coorparoo, QLD

We have a Kaypro in the Your Computer *office, and have experienced the same problems you describe. We, too, have sent our machine back for repair. It still doesn't work. It's now sitting under a pile of newspapers, unused. The machine is too unreliable for us to consider doing any serious work with it.*

We did get a suggestion from another reader that improved the performance of his early model Kaypro. He opened up the machine and pressed in all the chips in case any had worked themselves out of their sockets. He reported a marked improvement in the operation of the drives. When we tried this fix it did nothing for the performance of our machine.

We're about to send the Kaypro to President again. If we get satisfaction, we'll let you know.

MAKING THE BULLETIN BOARD CONNECTION

Help! I own a Sinclair ZX Spectrum 48 Kbyte machine with a ZX Interface 1 board and a ZX Microdrive. The Interface 1 has an RS232 serial interface. Can I connect a modem to it? If I can, then how do I do it? Does it have to be a particular modem? And what about the communications software needed to run the modem?

I need to know how to connect a modem to my computer because I am interested in joining the *Your Computer* Bulletin Board. Also, I can get a cable that changes the RS232 9-pin plug to the more standard 25-pin plug, if required, as all the modems I have seen use this type of plug.

TIM LE LIEVRE
Ballarat, VIC

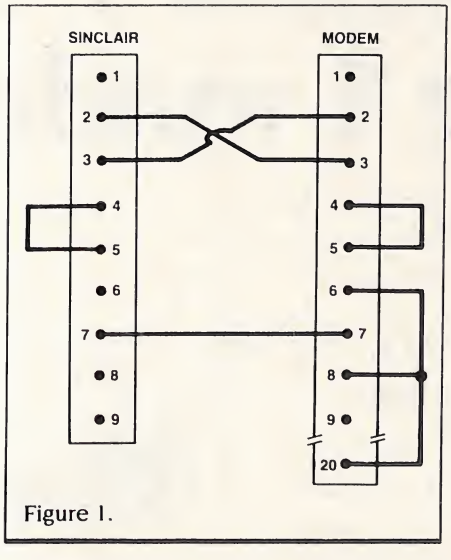

Figure 1.

You can connect a modem to your Sinclair through the Interface 1, and in most cases any modem will work. However, for it to be suitable for use with the Your Computer *Bulletin Board, it must be able to work at 300 baud full duplex, and comply to the CCITT V21 standard. For more on this end of the matter refer to the article on bulletin board operation in* Your Computer, *October 1984*

How you should connect the modem is always a hard question. The technique for connection is difficult and would require an article of its own, so if you cannot get the cable made up for a reasonable price by a technician, the next best thing you can do is buy and read The RS-232 Solution *by Joe Campbell, reviewed in the February issue of* Your Computer. *The book is distributed in Australia by* ANZ Books *and explains a logical approach to determining and implementing an* RS232 *connection. We are planning to publish an article on cable making, to help readers learn to wire up their own connections.*

Your Sinclair supplier should be able to provide you with a modem and cable to match the Spectrum. If not, you could try the connections in Figure 1 as a starting point (preferably with your 'RS-232 Solution' in hand). You can see that we have 'pulled-up' pins 4 and 5 on both ends of the cable and pins 6, 8 and 20 on the modem end. These pins are used in handshaking, which is only required when a device falls behind when processing received data. This isn't a problem for us so we can get away with tricking the devices without using extra wires.

As far as software goes, you can easily write a simple terminal program, if you know the address of the Interface 1's serial port. All you have to do is read from, and display, the input from the port, or read from the keyboard and send it out, to effect a dumb terminal connection. You must get the protocols right, these should be documented, but that is basically it. The program will be about 20 lines long. My attempts to track down Sinclair communications software were unsuccessful, but if anyone knows of any and lets me know I'll publish the details in a future Q and A.

WHICH IIe DISKS RUN ON THE IIc?

Could you please tell me how I find out which Apple IIe programs will run on the IIc. I have a IIc and the local Apple people can't help. What is it in a IIe program that needs to be compatible? I can't find that out either. Should all IIe programs run on a IIc?

CHARLES GOODRIDGE
Spearwood, WA

According to Apple Australia the Apple IIc *should run all IIe software, but, for a number of reasons, it sometimes doesn't.*

The first problem is most often the fault of third-party software vendors. They have used some areas which Apple had reserved on the IIe for screen display holding areas. While code in these areas still works on the IIe, it doesn't work on the IIc.

Another problem is that the floppy disk drives on the IIc cannot handle some of the copy protection techniques used on disks for the IIe's drives.

Finally, the codes that were used to produce some of the inverse characters on the IIe are used for mouse icons on the IIc.

According to Apple, approximately 91 per cent of programs that run on the IIe will also run on the IIc, so in spite of the above limitations there is still a lot of software that will work without any difficulties. Although most available programs do work, you should not be complacent when buying. Make sure the program you're thinking of purchasing runs on a IIc, either by getting the salesperson to run it on a IIc, or negotiating for a refund if you take it home and find it doesn't work on your machine. □

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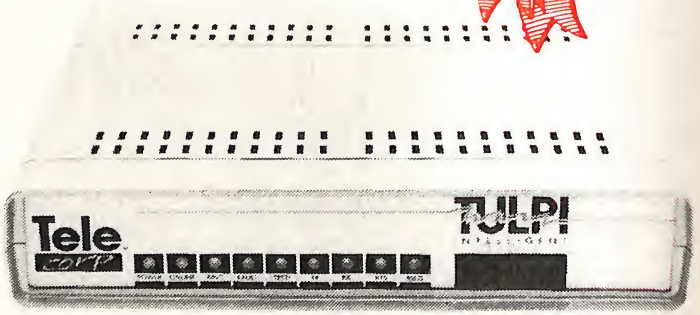

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To compile XAMN.BAS, use your SBASIC working disk and type SBASIC XAMN. Make sure you have plenty of room, as it is a big program. When the compilation is finished you can move XAMN.COM to your CP/M master disk.

Examining XAMN

To start the program, type XAMN and hit return. On startup, XAMN asks for the drive number to use and then displays the disk drive details and the command options available. Most of the drive information can be ignored, but some parts are important.

Firstly, check the drive number is the one on which you want to work. This is displayed both as a number (0 to 15) and a letter (A to P). If it is not correct use option 9, 'Select disk', to select the correct drive.

Note the sectors per track and the tracks per disk. The numbers on the left are decimal, while the numbers in square brackets are the hex equivalent, which you can ignore. When you examine the disk you will nominate the track and sector, so these two values will control the range of valid answers. Remember – sector numbering starts at one, track numbering starts at zero.

The next line displays the number of reserved tracks (either one or two). This is where the operating system lives, and it will be set aside even if the disk does not contain an operating system. Data storage starts immediately after the last reserved track; if there is one reserved track, and track numbering starts at zero, then the first track to contain data will be track 1.

The data stored on the first data track will be the disk directory, which will be followed immediately by file storage. Skip the next data line and look at 'no. of directory entries'. A typical value for this item is 64. As there are four directory entries per sector, 64 directory entries will take up 16 sectors. Therefore, in this example, the operating system is on track 0, the directory on track 1 (sectors 1 to 16), and file storage will start at track 1, sector 17.

File Blocks

The other item of importance in the introductory information is block size, typically 2048 bytes (2 Kbytes). The block is the basic unit of disk space for file storage with each sector on the disk allocated to a block (in this example 16 sectors per block).

Any time the operating system needs to know where a file is stored (or will be stored) it refers to the block numbers allocated to the file. Using the information contained in this heading section, the operating system can translate the block number into a sector and track, and physically position the disk mechanism to read the correct data.

To see the impact of blocks, select option 5 – 'Produce a map of disk'. This option displays each block on the disk as a one if it is used, and as a zero if it isn't. This is the map the operating system consults when it is asked to store a file; it searches the map to find free space for file allocation.

As a further example of blocks, select option 8 – 'Compute Trk & Sec from Block' – and nominate block 0. The program will respond with the track and sector of the first sector in the block. In our example above this would be track 1 sector 1.

If this option did not give you the sector number of the start of the directory as calculated above, it is possible the sector numbering scheme used by the operating system is not the same as that used in physically numbering the disk. Some Kaypro models use a logical sector numbering scheme starting at zero, while physical sector numbering starts at one.

To find the relation between logical and physical sector numbers, select option 1 – 'Examine a sector (physical)' – and nominate track 1 sector 1. Both logical and physical sector numbers will be displayed. The only point of this exercise is to establish the range of valid logical sector numbers; once you have done this, all further work can be in terms of logical sector numbers.

Restoring Deleted Files

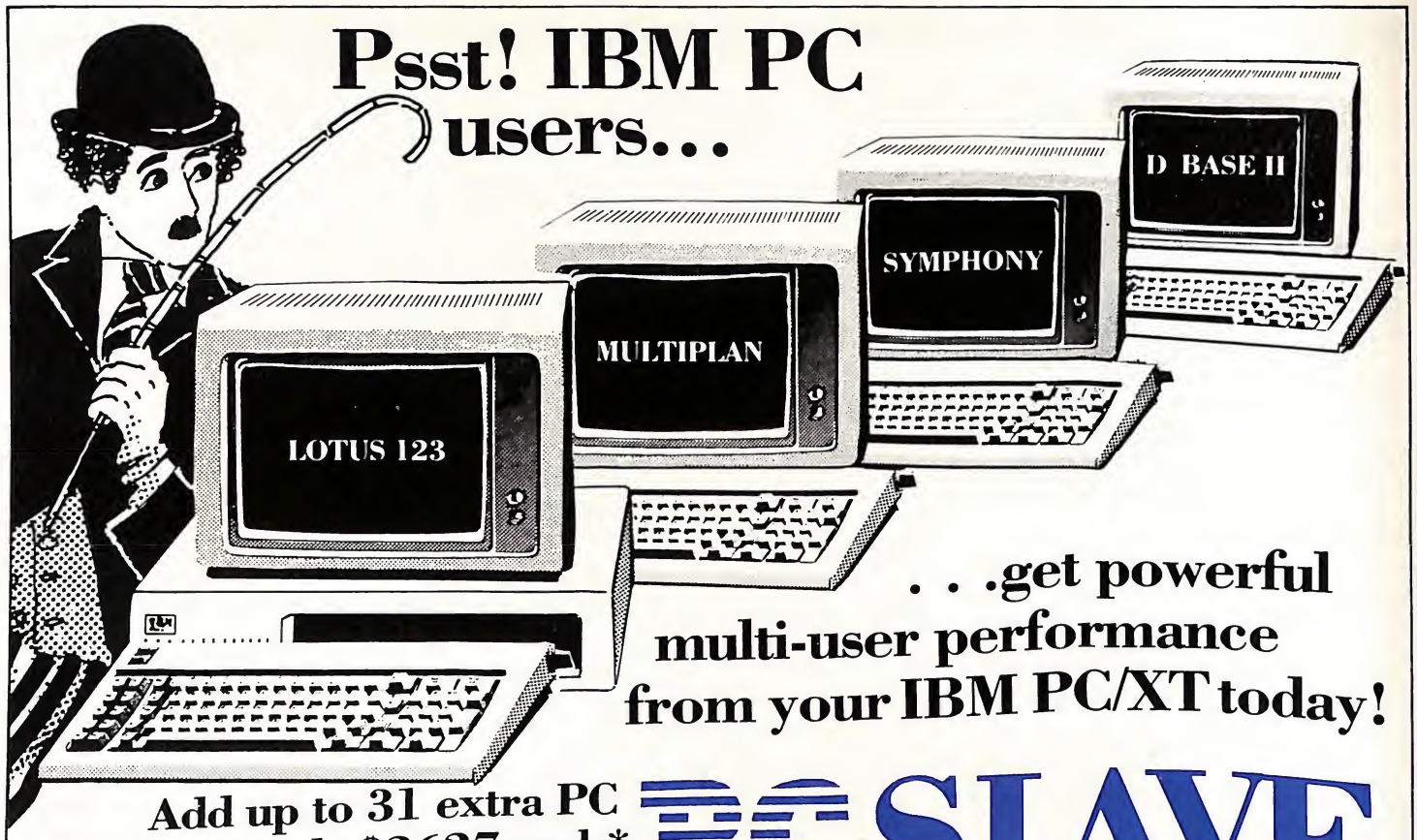
Now we have enough information to do something useful. By far the most common use for XAMN will be to restore files accidentally deleted. This is done by altering a 'deleted' flag in the directory entry of the file. Deleted files can only be restored in safety if you are *sure* no new files have been created since the file was accidentally deleted. If this is not so, restoring deleted files will not only be unsuccessful, it may also damage files created after the deletion.

The first thing to do is to find the sector containing the directory entry of the deleted file. Examine the directory area of the disk by selecting option 2, and then use the F ('Forward') option to search sequentially through the directory. Each sector contains four directory entries, and each entry uses 32 bytes, or two lines of the display. The first byte of each entry determines the status of the entry – if it has been deleted, the byte is set to E5.

To restore the file, enter change mode ('C'). The address of the first byte in the sector will be displayed. Move through the sector, if necessary, by hitting return until you get to the first byte of the entry for the deleted file. This will be an address of 0, 20, 40 or 60. Type in the new value for this byte. This new value should be 00, which will restore the directory entry to active status for user 0. (All your files are in user area 0 unless you have specifically nominated a different user area.)

```
Track, sectr? 2,16

Track= 2   Logical sector= 16              Physical sector= 16
0000  E5 44 45 4D 4F 20 20 20   20 54 58 54 00 00 00 80 eDEMO     !X!....
0010  BE BF C0 C1 C2 C3 C6 D0   00 00 00 00 00 00 00 00 >?@ABCFP ........
0020  00 4C 45 54 54 45 52 20   20 20 20 20 00 00 00 43 .LETTER      ...C
0030  D5 D8 D9 E3 E4 00 00 00   00 00 00 00 00 00 00 00 UXYcd... ........
0040  E5 44 45 4D 4F 20 20 20   20 54 58 54 01 00 00 0C eDEMO     !X!....
0050  D1 00 00 00 00 00 00 00   00 00 00 00 00 00 00 00 Q....... ........
0060  E5 4C 45 54 54 45 52 20   20 42 41 4B 00 00 00 21 eLETTER   BAK...!
0070  EA EB EC 00 00 00 00 00   00 00 00 00 00 00 00 00 jkl..... ........

(F)oward, (B)ackward, (R)ange, (C)hange, (E)xit ? C
0000 E5 e 00
0001 44 D .

 2          16
0000  00 44 45 4D 4F 20 20 20   20 54 58 54 00 00 00 80 .DEMO     !X!....
0010  BE BF C0 C1 C2 C3 C6 D0   00 00 00 00 00 00 00 00 >?@ABCFP ........
0020  00 4C 45 54 54 45 52 20   20 20 20 20 00 00 00 43 .LETTER      ...C
0030  D5 D8 D9 E3 E4 00 00 00   00 00 00 00 00 00 00 00 UXYcd... ........
0040  E5 44 45 4D 4F 20 20 20   20 54 58 54 01 00 00 0C eDEMO     !X!....
0050  D1 00 00 00 00 00 00 00   00 00 00 00 00 00 00 00 Q....... ........
0060  E5 4C 45 54 54 45 52 20   20 42 41 4B 00 00 00 21 eLETTER   BAK...!
0070  EA EB EC 00 00 00 00 00   00 00 00 00 00 00 00 00 jkl..... ........

(W)rite to disk, (C)hange more bytes, (A)bort ? W
Writing sector to disk...
(F)oward, (B)ackward, (R)ange, (C)hange, (E)xit ?
```

Table 1.



When finished with changes, enter a full stop to get out of change mode, and select option W to write the sector back to disk.

Handling Large Files

The rest of the directory entry is also of interest. After the status byte there are eight bytes of filename, followed by three bytes of filename extension. Line 2 of the directory entry contains the list of block numbers defining the area of the disk at which the file is stored. To examine the file itself, you could select one of these block numbers, convert it to track and sector in option 8 and then use option 2 to examine the sectors.

The last bytes in line 1 contain information which is important if you are restoring a file. If a file is so large it requires more than eight blocks, then a second entry is opened for the file. If this is the case, then all directory entries have to be restored.

The directory entry sequence number is stored at the first byte after the filename extension – the twelfth hex value on the first line. This will be 00 for the first directory entry. If there is a second and subsequent entry, the file size byte – the last value on the first line – will have a value of 80h. Any value of less than 80h indicates this entry is the last one for the file. Multiple directory entries are not necessarily stored in any logical order.

It is critical all directory entries for a file are restored if the file is to be successfully recovered. Incidentally, this facility of multiple entries per file is the reason you sometimes get a 'directory full' message even though fewer than 64 files are on the disk.

Table 1 shows an XAMN session in which one of the directory entries of a multiple-entry file has been restored. The first byte for the first entry for DEMO.TXT – address 0000 – has been changed from E5 to 00. To complete the job, address 0040 must also be altered to 00. It is by chance (although not uncommon) both directory entries are in the same sector.

The only bug I have found in XAMN (apart from the spelling) is it sometimes forgets to write the altered sector back to disk. This is not the program's fault, but is actually caused by the Kaypro doing some internal disk buffering. It can be avoided by reading a different sector, preferably on a different track, thus forcing the Kaypro to flush its buffer. □

BY BILL BOLTON

Your OPERATING SYSTEM

PC-DOS 3.0

OVER THE past few months I have read and heard a considerable amount about PC-DOS 3.0 which is not in general circulation.

The first thing you'll notice about PC-DOS 3.0 is it is somewhat larger than PC-DOS 2. The resident part of PC-DOS 3.0 (contained in the IBMDOS.COM and IBMDIO.COM files) is 15 Kbytes larger than for PC-DOS 2.10, while COMMAND.COM is 5 Kbytes larger. When non-initialised buffer space is added (which depends somewhat on the system configuration), the total DOS size can be up to 48 Kbytes on a PC-AT with hard disk. If you start allocating extra buffers through the CONFIG.SYS options you can eat even more space.

The BATCH processor has been modified and no longer supports the undocumented '.' as an alternative to the REM statement. DEBUG and EXE2BIN are both now version 2.4, though I don't know what the differences from previous releases are.

The undocumented SWITCHAR option in PC-DOS 2 has disappeared from CONFIG.SYS. This allowed swapping some of the system delimiters to UNIX-style delimiters. New options in CONFIG.SYS are STRING, FCBS, LASTDRIVE and COUNTRY. FCBS and LASTDRIVE allow you to control how much memory DOS uses for internal tables, in a similar manner to the FILES and BUFFERS options.

There are two new commands: LABEL allows changing the disk volume label on any disk (but not with 100 per cent reliability); ATTRIB allows changing the read-only attribute on files. Unfortunately, it wont let you change the hidden and archive attributes.

PC-DOS 3.0 uses the Program Segment Prefix (PSP) information of a program differently from PC-DOS 2. PC-DOS 3.0 also reports the number of drives available in a system differently from PC-DOS 2.

There have been a number of additions and modifications to PC-DOS 3.0 function calls. As the DOS Technical Manual for PC-DOS 3.0 is a rare specimen, following is a summary of the major differences.

Function Call Changes

INTERRUPT 24H Critical Error Handler
New status information is passed to the function in the AH register. PC-DOS 3.0 returns an extra error condition. The programmer can request that the offending system call return be 'failed', in addition to the existing 'ignore', 'retry' and 'terminate' conditions.

INTERRUPT 2FH
This is a new interrupt which provides access to the print spooler from applications software. An application can add files to the print queue, cancel files in the print queue and examine the list of files waiting to be spooled.

INTERRUPT 21H, Function 38H Get or Set Country Information
This has been greatly expanded. The country code can now be set as well as read. There is a capacity for over 255 country codes. Much more information is now passed back in the parameter block about country specific characters, delimiters, and so on.

INTERRUPT 21H, Function 3DH Open File
This has been enhanced with a view to the promised networking interface in PC-DOS 3.1. When a file is opened, an application program can specify if it will be inherited by a 'child' process running in the same network node. It can also specify whether it will be 'shared' by another task running anywhere on the network.

INTERRUPT 21H, Function 44H I/O Device Control
Two new capabilities have been added. First, an application can find out whether a block device has removable media. Second, an application can set the number of retries and the delay between retries for 'file sharing conflicts'.

INTERRUPT 21H, Function 59H Get Extended Error
New function call. It can be called after an error code is returned by another function. It will provide more information about the type of failure (whether temporary, system internal, hardware, and so on) and the recommended action (such as abort, retry and delay).

INTERRUPT 21H, Function 5AH Create Temporary File
New function call. It will create a file with a unique name, in any specified directory, from a path string supplied by the application. It returns a complete path and file specification string. The file is not deleted automatically when the application ends.

INTERRUPT 21H, Function 5BH Create File
New function call. It is the same as function 3CH, except it will return an error if a file of the same name already exists. Function 3CH truncates an existing file of the same name to zero length and does not indicate an error.

INTERRUPT 21H, Function 5CH Lock or Unlock File Access
New function call. It allows an application to obtain exclusive access to a region of a file. This can occur even if the file is being 'shared' with other applications.

INTERRUPT 21H, Function 62H Get Program Segment Prefix Address
New function call. It returns the address of the PSP of a program. The PSP contains the relevant loading data for that program.

Developing Applications for PC-DOS 3.0

With the release of PC-DOS 3.0 and the announcement of Topview and IBM networking, IBM is making it clear to programmers that the old 'go straight to the machine' approach is dangerous.

If you need to develop an application for PC-DOS 3.0 you should definitely ...

☐ Use the Extended File functions (3CH to 42H) for file manipulation, rather than the older CP/M-like FCB calls. In any case, the extended functions have better error reporting and support the hierarchical directory structure. They also support the new file sharing feature.

☐ Release memory not needed by your application by using the Modify Allocate Memory functions (48H to 4AH). PC-DOS will allocate *all* available memory to an application when it loads. This is not conducive to multi-tasking and network environments, so you must make sure your program releases memory it doesn't need. You should also examine the PSP of your program to see how much memory it has really been allocated and ensure you do not interfere with memory outside your allocation.

☐ The 80286, used in the PC-AT, has the ability to support multiple tables of interrupt vectors in protected mode. You should not access the interrupt vectors directly. DOS function calls 25H and 35H will allow you to set and retrieve the contents of interrupt vectors as the currently executing operating system interface sees them.

☐ Examine the DOS version number through function 30H. If your program is ▷

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Virtually any 8 bit microcomputer using a Z80 processor and running CPM 2.2 or 3 can run MSDOS, CPM86, or CPM68K software. This is achieved by the CO16 attached processor which connects to the CP/M 2.2 microcomputer via the Z80 socket. The original Z80 system then acts as an I/O server to the 16 bit CPU. Three modes of operation are then possible—operation as a normal CP/M 2.2 (or 3.0) system, operation as a CP/M 2.2 system with up to 760K of RAM disk, and operation as a 16 bit system running MSDOS, CPM86 or CPM68K.

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Your OPERATING SYSTEM

running under PC-DOS 3.X, you should use function 59H to get more information about the nature of the failure and what action to take.

☐ Use the DOS EXEC function (4BH) to load other tasks from an executing application rather than setting up your own PSP. This has important implications for Topview and Networking.

☐ Perform all mode changes to the video buffer via calls to the ROM BIOS. If you must write directly to the video buffer, set up a variable containing the address of the buffer segment. In Topview a 'shadow buffer' is used; if you already have your code set up this way, adaptation to Topview will be much simpler.

☐ DOS often provides buffering between you and its standard I/O devices. It's usually not worthwhile trying to second guess DOS buffering with blocking and deblocking in applications. When writing text to display devices, send strings rather than individual characters wherever possible.

☐ Employ good housekeeping techniques in your applications to ensure you close all file control blocks and handles. If regions of a file have been locked, ensure they are unlocked.

☐ Use the DOS EXIT function (4CH) to terminate your application with an error return code. The error return code can be queried by the parent process or the batch processor.

☐ If writing something which needs to stay resident in memory, use the DOS KEEP PROCESS function (31H) rather than interrupt 27H. The KEEP PROCESS function allows for an exit code which is retrievable by the parent process through the WAIT function (4DH), or testable as an error level by the batch processor. KEEP PROCESS also allows for resident programs larger than one segment (64 Kbytes).

Concurrent PC-DOS Start-up

Following my discussion of the AUTOEXEC.BAT file I use under PC-DOS, several readers have asked what start-up file I use under Concurrent PC-DOS. I have my PC XT hard disk set up as an 8 Mbyte DOS partition and a 2 Mbyte CP/M partition. The only reason I have it that way is because the machine is used for software support on several operating systems and I need a CP/M partition on the disk to support CP/M-86. As I must have this partition, I have placed most of my Concurrent PC-DOS system files in it. Otherwise, I would have the whole hard disk partitioned as a 10 Mbyte DOS partition and have all the Concurrent PC-DOS there.

In a Concurrent PC-DOS environment there are four virtual terminals active on the IBM PC screen. At boot time, each virtual terminal has its own start-up batch file. These are called START-UP1.BAT to START-UP4.BAT, so each virtual terminal can perform an individual start-up procedure to suit its needs.

STARTUP1.BAT

```
d:sysdisk d:
astclock
printer1
```

Line 1: The CP/M partition on my hard disk is identified by Concurrent PC-DOS as drive D:. However, I load Concurrent PC-DOS from drive C: as part of my PC-DOS AUTOEXEC batch function (see the last 'Operating Systems' column). So Concurrent automatically makes the boot volume the default system disk, which it will search for system files if it fails to find them in the current working directory. As I have all my Concurrent PC-DOS system files on the D: drive, I want to change the SYSDISK from the boot drive, C:, to drive D:. As the SYSDISK command is on the D: drive to start with, being a system file, I need to tell the batch processor where to find it.

Line 2: This line sets the time and date in Concurrent PC-DOS from my AST six-pack multi-function board by using the standard PC-DOS utility supplied by AST with the board. As this is a general system function, once the time and date have been set by one virtual terminal, all virtual terminals will know about it.

Line 3: For some reason the Concurrent family of operating systems on the IBM PC has always had the printer port assignments numbered differently from PC-DOS. The default printer under Concurrent PC-DOS is Printer 0, but this doesn't correspond with the default printer port under single user PC- DOS ... which turns out to be Printer 1 as far as Concurrent is concerned. Concurrent can support up to five printers. This line also makes Printer 1 the default printer for this virtual terminal.

STARTUP2.BAT to START-UP4.BAT

```
d:sysdisk
d: printer 1
```

On my system the start-up files for the remaining virtual terminals are all the same. The SYSDISK is set as before and, as I only have one printer, I set all the virtual terminals to access the same printer.

If you have an interesting STRTUP file for Concurrent PC-DOS send it in; I will print the best ones in this column. ☐

PAMS NUMBERS

News concerning the increasing number of public access message systems coming online is far too much for Bill Bolton to fit in his column these days, so we've decided to give it a page on its own.

THE TEXAS INSTRUMENTS User Group system in Sydney is now online for longer and consistent periods daily, and the sysops have decided to call it the TEXPAC-BBS. The times are in the PAMS numbers list below. There is also a TI User Group system online in Brisbane on (07) 263 6161 (TI-BBS). This system is only on line for the specified times on week nights.

Another New Zealand system has appeared: the Rotorua Bulletin Board (ROT-BBS) is online 24 hours. To gain visitor access you should give the access name of 'TEMP' and a password of 'PASS'.

By the way, you don't need to have ISD access on your exchange to be able to get to the New Zealand systems. If you have STD you can dial 0014 and then the country code for New Zealand, which is 64, and then the area code and number. The 0014 number provides access to South Pacific zone countries such as Fiji, French Polynesia, Nauru, New Caledonia, New Zealand, Papua New Guinea, Samoa, Solomon Islands and Vanuatu. Of course, ISD rates still apply to these calls. For some reason there is no information in the white pages telephone book about the existence of the 0014 access code, but the operator on international enquiries (0103) was quite happy to confirm its existence and expressed surprise that it wasn't in the phone book!

The Numbers

Queensland (EST)

Software Tools RCPM (ST-RCPM) (07) 378 9530 24 hours
BEX RCPM (BEX-RCPM) (07) 393 3151 24 hours
Tomorrowland DIRECT (BRIS-TLD) (07) 286 2438 24 hours
Texas Instruments (TI-BBS) (07) 263 6161 2100-0600 weekdays

New South Wales (EST)

Mi Computer Club BBS (MiCC-BBS) (02) 662 1686 24 hours
Micro Design Lab RCPM (MDL-RCPM) (02) 663 0151 24 hours
Sydney Public Access RCPM (SPA-RCPM) (02) 808 3536 24 hours
Sydney Osborne UG (AUSBD-RCPM) (02) 95 5377 24 hours
Tesseract RCPM (TES-RCPM) (02) 651-1404 24 hours
Sorcerer UG (SUG-RCPM) "Ring Back" (02) 387 4439 1800-0800 weekdays 0800-2400 weekends
Omen RTRS (OM-RTRS) (02) 498 2495 1630-0900 + 24 hours weekends
Sydney TRS-80 UG RTRS (STRUG-RTRS) (02) 332 2494 24 hours
Prophet BBS (PROPHET-BBS) (02) 628 7030 24 hours
Dick Smith Electronics (DSE-BBS) (02) 887 2276 24 hours
Tomorrowland DIRECT (SYD-TLD) (02) 411 2053 24 hours
Sydney Apple UG (AUG-BBS) (02) 451 6575 24 hours
Texas Instruments UG (TEXPAC-BBS) (02) 560-0926 1900-0600 + 24 hours weekends
Oracle RTRS (ORACLE-RTRS) (02) 960 3641 0-1800 weekdays 0-0800 weekends
Newcastle Micro RCPM (NMC-RCPM) (049) 68 5385 1700-0830 + 24 hours weekends

Victoria (EST)

Melbourne CBBS (MICOM-CBBS) (03) 762 5088 24 hours
TARDIS RCPM (TARDIS-RCPM) (03) 67 7760 1800-0800 + 24 hours weekends
Sorcerer CUA RCPM (SCUA-RCPM) (03) 434 3529 24 hours
East Ringwood RCPM (ERING-RCPM) (03) 870 4623 1600-2400 daily
PC Connection IBBS (PCC-IBBS) (03) 528 3750 24 hours
HiSoft IBBS (HISOFT-IBBS) (03) 799 2001 24 hours
Computers Galore IBBS (CG-IBBS) (03) 561 8479 24 hours
OMEN IV RTRS (OM4-RTRS) (03) 846 4034 24 hours
Gippsland RCPM (GL-RCPM) (051) 34 1563 24 hours
Gippsland MAIL BUS (GL-MBUS) (051) 27 7245 24 hours

Tasmania (EST)

Mike Scott's BBS (MS-BBS) (003) 34 9411 24 hours

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BY DOM SWINKELS

Your HITACHI

I APOLOGISE to the regular readers of this column for the long break, but since my last appearance I have been rather busy. One of my activities was a six-week overseas trip, during which I attended a large microcomputer show in London. Although larger than any show in Sydney or Melbourne it seemed to me to be just more of the same: instead of one or two machines of each type there were ten or 15, with the usual thousands of kids trying each new game and peripheral device.

There were, of course, a few machines not often seen in Australia. I was most impressed with the Apricot range, which included a new portable, now available in Australia. In fact, the New South Wales Government is making a major purchase of Apricot machines. The portable was impressive, featuring true portability (about 6 kg) and a separate keyboard communicating with the system via an infrared beam. It is Intel 8086 based, uses MS-DOS 2.11, has a 25-line by 80-character LCD and an integral voice recognition system. It is sold with the 'Super' series of software packages. With 256 Kbytes of RAM, a built-in 720 Kbyte microfloppy, 128 Kbyte colour display RAM and a cordless mouse, the price worked out at $A3200. I wonder what they'll sell for in Australia.

But what am I doing reviewing an Apricot machine in this column? Well, the truth is I didn't see any new Hitachi equipment in England or the US – another reason why you haven't seen this column for so long.

Peach For Sale

My wife and I use IBM equipment at work so we recently decided to buy an XT for use at home. Something has to go, so we now have a pre-loved Peach (sorry, MB-6890) for sale. If you're interested drop me a line at 23 Dalvern Close, Adamstown Heights 2289.

The MB-6890 was our third home computer, preceded by a TRS-80 and an Apple. The TRS-80 was sold about four years ago but the Apple is still around. Why are we keeping the older Apple and selling the newer MB-6890? The much larger range of software and hardware for the Apple makes it more likely to be useful in the future. Apple has been able to extend the lifecycle of its machine beyond the three years which seems to be about the limit for machines that are not so well supported. As I have written on a number of occasions, the Hitachi hardware is excellent but the support (software, extensions, manuals) leaves much to be desired.

So, where do we go from here? My equipment is for sale and represents excellent hardware. It is well made and has been completely reliable. I wouldn't recommend it for business use unless you have a specific application that you know is supported by software, and you're not likely to want to do something different in twelve months' time. For educational or hobby use it's an excellent machine, particularly if you can join suitable user groups for support and exchange of public domain software.

The Public Domain

Public domain software is still a much neglected area. The software I have written is in the public domain and I know someone has already improved on the Terminal utility I wrote for the MB-6890. This is the best way to develop good-quality, cheap, general-purpose software; someone starts with an idea and makes it available to others with similar interests who then improve on it. It might even be made more user friendly so non-experts can use it.

In the case of Hitachi equipment, the person to contact for support and software exchange is Wayne Hobden, who publishes the *Peach User Notes*. I have mentioned PUN before, but new users can write to Micro Innovation Engineers, PO Box 33, Kurrajong Heights 2758. Wayne has about 250 subscribers out of the 3000 or so MB-6890 machine owners in Australia, and plans to provide more material for this column.

Under Wayne's direction, this column will in future cover a broader range of information, with the title 'Your Japanese Computer'. However, the first topic is likely to be the new MB-S1 computer from Hitachi; Wayne tells me it is everything we had hoped the MB-6890 would be several years ago. So Hitachi users will certainly still find plenty to interest them within the new format. □

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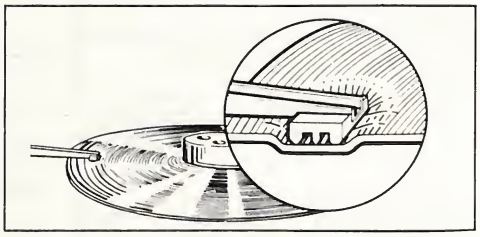

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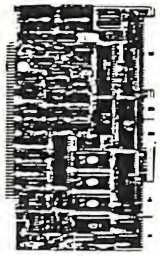

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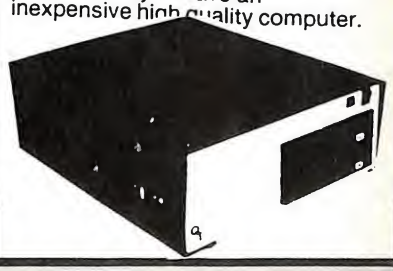

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QT COMPUTER SYSTEMS

I WAS RECENTLY asked by a discerning Commodore owner what Commodore's intentions were for the near future. More to the point, was he the owner of a soon-to-be-extinct machine? Despite nasty rumours to the contrary, it appears that the C64 as we know it today is here to stay, in one form or another, for some time yet.

We can expect to see a series of major improvements, starting with the release of the Commodore 128. This version will to all intents and purposes be fully compatible with the C64. However, at the flick of a switch it turns into a truly flexible beast capable of many amazing feats.

Version seven of Commodore BASIC will be incorporated in the first mode of operation, making a whole array of new commands available. In the second mode the screen will change to eighty columns, and CP/M version 3.0 will be at your fingertips. The same disk drive will cope with both DOS formats at a speed which will be most acceptable.

If you hadn't guessed by now, the 128 stands for the 128 Kbytes of RAM onboard. I believe this amount may be expandable, but we shall have to wait and see. The entire unit sounds very appealing. Existing owners may also be given the option to upgrade their old C64s, which would be a great piece of public relations on Commodore's behalf.

Pitstop II

Tired of all those one-player racing games? Looking for a more socially interactive form of entertainment? Cast your eyes on the screen of Pitstop II and be amazed. (This is all a ploy to try and get some work as a copy writer for an advertising company ...)

But really, folks, at first Pitstop II seems like nothing worth writing home about, in concept at least. It's a racing game. The difference is it's a two-player game, and there are a few interesting additions – for example, the pits, where you must repair damaged tyres and refuel. Perhaps I should explain in more detail.

The screen is divided into two, with one player at the top and the other at the bottom. The track is displayed in much the same way as Grand Prix or Pitstop I, a sort of three-dimensional image with mountains, clouds and a few billboards. Each player can see the other at the start of the game, but once you become separated the radar display comes into action. This display shows where you are on the circuit and where the other player is.

Unlike Grand Prix, Pitstop II is more realistic in the bangs and revs area. Which reminds me, in this game the only way you can crash is by blowing a tyre. At first this seems a little silly, but in practice it is far more playable and less violent – which is very important these days!

A single race may consist of between three and twelve laps of any of the six different circuits you can choose from. During the course of a race, it is normally necessary to make a pitstop to refuel and replace worn tyres. This operation is fully controlled by the player. Timing is critical, so often if you're way behind it's possible to catch up by being a little more speedy in the pits.

Overall, Pitstop II is a great game that will undoubtedly keep you entertained for some time. The choice of circuits provides the necessary variety, and there are also several difficulty modes. Our review copy came from CBS, the Australian distributor of the game, and it's available at most retail outlets.

Breakdance

It is not generally known that I've dabbled in this death-defying sport on large pieces of scrap cardboard and other such surfaces. With this small experience I was able to fully appreciate this next program, which simulates all the moves without the risks.

At first I expected to see that Breakdance had been developed by some whiz-kid programmer in the heart of the Bronx. Not so; this is another Epyx production, the firm which, after a brief holiday, has just released a new range of very promising new programs.

In Breakdance there are five different options you may tinker with, the best one being the ability to choreograph your own dance routines. Backspins, forward flips, crab walks, even a suicide – all go to make up a really wacky-looking show. Some of the other options include a battle with another break team, which you must outdance or take a dive in the city river.

Impressive graphics, music that is almost there and plenty of variation go to make Breakdance the sort of game you might get out at parties for a bit of a laugh. Once again our review copy came from CBS – thank you, you may have saved a few broken bones.

Turbo 64

Some time ago I mentioned a product called Turbo 64, but at the time I was unsure of the name and called it Turbo DOS by mistake. For those who were confused, the fault was not in your minds, it was on this page. My apologies.

BBS Systems

Many months ago there seemed to be a sudden surge in interest in bulletin board systems. The surge has continued to grow until now, and there has also been a consistent increase in the number of systems available to hook up to.

Commodore users have unfortunately been ignored as a single group and treated as just another micro. But there are thousands of us! Now at last there is a forum through which we can voice our troubles, expand our knowledge and discuss ways of solving the Middle-East crisis. I refer, as anyone who has ever used the system may have guessed, to 'Keeyboards'.

It's not a Commodore BBS, but if you connect to it you will discover several such systems do exist. It's very easy to use, very professional and has an area especially for Commodore users. The system is very flexible, allowing various screen widths, file transfer protocols and so on.

The first time you connect you are granted visitor access, with a maximum time limit of 45 minutes. Very reasonable. From this point it is possible to view some of the amazing notices which exist on the bulletin board and find out more about the whole system.

If you like what you see, and want to put it all to better use, you are then required to register. After they 'check you out', you are given further access capabilities such as electronic mail, and the ability to send and receive all types of messages. Registration was made necessary because of several rather undesirable types around the traps who've been harassing hapless BBSs with nuisance messages and obscenities and generally causing chaos

In fact almost all the BBSs now online have had to increase security to a degree that makes it harder for such individuals to cause trouble. This is unfortunate in a way, but it does help keep the good and bad separated. If you're interested in Keeyboards, it is a 24-hour system and the number to call is (02) 631-3282 □

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We're very sorry to report that pressure of work has forced our Microbee columnist, Mike Newnham, to stop writing this column. This month for Microbee users we have an article by Alan Goodison on auto-booting a menu on a disk Microbee, using Microworld BASIC, and next month Colin Tringham will take over as our regular Microbee columnist. Colin helped form the Sydney Microbee Users' Group and was, until recently, editor of the group's newsletter. We're sure his columns will be as interesting and valuable to Bee users as Mike's always were.

```
Address  Code       Mnem  Operand
4A00     21 00 4B   LD    HL,4B00
4A03     11 00 00   LD    DE,0000
4A06     01 00 10   LD    BC,1000
4A09     ED B0      LDIR
4A0B     00         NOP
4A0C     00         NOP
4A0D     00         NOP
4A0E     00         NOP
4A0F     00         NOP
4A10     00         NOP
4A11     00         NOP
4A12     00         NOP
4A13     00         NOP
4A14     21 55 AA   LD    HL,AA55
4A17     22 7B DF   LD    (DF7B),HL
4A1A     21 00 80   LD    HL,8000
4A1D     22 7D DF   LD    (DF7D),HL
4A20     21 1E 80   LD    HL,801E
4A23     22 A2 00   LD    (00A2),HL
4A26     3E 40      LD    A,40
4A28     D3 08      OUT   (8),A
4A2A     21 00 F8   LD    HL,F800
4A2D     3E 03      LD    A,3
4A2F     77         LD    (HL),A
4A30     23         INC   HL
4A31     7C         LD    A,H
4A32     FE 00      CP    0
4A34     20 F7      JR    NZ,4A2D
4A36     3E 00      LD    A,0
4A38     D3 08      OUT   (8),A
4A3A     CD 2A E0   CALL  E02A
4A3D     3E 40      LD    A,40
4A3F     D3 08      OUT   (8),A
4A41     3A 00 F8   LD    A,(F800)
4A44     FE 03      CP    3
4A46     C2 55 4A   JP    NZ,4A55
4A49     3E 00      LD    A,0
4A4B     D3 08      OUT   (8),A
4A4D     3E FF      LD    A,FF
4A4F     32 99 00   LD    (0099),A
4A52     C3 00 E0   JP    E000
4A55     3E 00      LD    A,0
4A57     D3 08      OUT   (8),A
4A59     32 99 00   LD    (0099),A
4A5C     C3 00 E0   JP    E000
```

Figure 1.

WHILE IT may be true that 'real programmers use Microsoft', they'd have to be masochists to do so on such a flexible system as the disk-based Microbee. Many fine programs are now appearing which utilise the power of Microworld BASIC (and recognise its quirks!).

This article describes a method used to create a MENU program which allows programs on disk to be run by simply pressing a particular key. The MENU program auto boots on start-up as well as after exiting any program on the disk.

The procedure consists of four parts:

1. Create a 'shell' file which is used each time you wish to write a menu command file.
2. Write a program in Microworld Disk BASIC to provide the selection menu for the programs on the disk.
3. Merge the BASIC program with the 'shell' in No. 1 and save as a .COM file under CP/M.
4. Copy programs to the disk and use CONFIG.COM to auto-boot the MENU.COM program.

The 'Shell' File

Ensure that the file BASIC.COM (Microworld BASIC) is on your working disk and RESET the system. Run BASIC.COM from CP/M, which takes you to a Cold Start Disk BASIC.

Type: LOADM "BASIC.COM"4352 ⟨CR⟩

This will load the Microworld BASIC file into memory at 1100H – 4352 decimal for normal people.

Now enter the Monitor via |RESET| and |M| and move the file to its normal load address of 100H.

Type: M 1100 100 4800 ⟨CR⟩

Now alter three bytes, beginning with 10C: 21 00 00.

Type: A 10C ⟨CR⟩
Hit C3 (10C changes from 21 to C3)
Hit 00 (really no change at 10D)
Hit 4A (that's at 10E)
Hit ⟨ESC⟩

Now enter the Jump On Reset and BASIC initialisation routines shown elsewhere in this article into memory from 4A00 to 4A5E. After completion, check that they are correct. ▷

```
100 POKE 140,1:POKE 257,2     <Break Key and UPPER Case>
105 CLS:INVERSE:CURS10,1:PRINT"              SELECTION  MENU
              "\\:NORMAL
110 L=4                       <Number of DATA lines>
115 T=7                       <Number of Titles>
120 FOR X = 1 TO L:READ T1$,T2$:PRINT TAB5 T1$ TAB35 T2$:NEXTX
125 CURS8,14:PRINT"Press the required letter [A-"CHR(64+T)"]"
130 PRINT TAB8 "[RESET] and [B] will EXIT any program."
135 K1$=KEY:IF K1$ = "" THEN 135 ELSE LET K = ASC(K1$)-64:
    IF K<1 OR K>T THEN 135
140 CLS:ON K GOTO  141,142,143,144,145,146,147,148,149,150,
   151,152,153,154,155,156,157,158,159,160 <enough for 20>
141 RUNM"CHESS"               <whatever the filename is>
142 RUNM"PENET.ML"            <enter the .ext if there's one>
143 RUN"VIPER"                <a .MWB type program>
144 RUNM"GALAXY.COM"256       <loads at 100H>
145 RUNM"SURVIVOR"            <loads at default of 900H>
146 RUNM"ROBOTMAN"
147 RUN"PROSPECT"
                            <Enter more lines if required>
200 DATA"A. Chess","B. Penetrator"  <two titles per line and>
210 DATA"C. Viper","D. Galaxy"      <separated by a comma.  >
220 DATA"E. Survivor","F. Robot Man"
230 DATA"G. Prospector",          <don't forget the comma if>
                                  <there's an odd number of >
                                  <titles entered.          >
300 DATA"X","X"                   <if an X appears on your  >
                                 <screen, you've got it wrong>
```

Figure 2.

Type: A 4A00 ⟨CR⟩ and type in the code as shown in Listing 1. Hit |ESC| when all is correct. Return to CP/M by typing: G 0 ⟨CR⟩

Save the 'shell' to disk by typing: SAVE 74 M4352 ⟨CR⟩. The file M4352 will be used each time you wish to create a MENU.COM file, so save it to your work disk

Write a Menu Selection Program

Boot the system and run BASIC.COM from CP/M. Write a menu program which will list a number of program titles on the screen and get the user's selection. Any program which runs under Microworld Disk BASIC can be included and called from the Menu (BASIC or Z80 code programs).

Listing 2 shows a typical menu selection program. The program must not reach 2 Kbytes in length, otherwise the block move routines will not keep the program intact. You can check this when you later enter the Monitor, by examining location 8D3. If the byte shows a value above 0F, the program is too long, but this would be unusual. The code shown in Listing 2 is less than 1 Kbyte long. It holds the titles of the programs on disk in DATA statements, and each program has its own RUN line.

Save to disk as a unique menu filename, for example SAVE "MENU1".

Run the program a few times, and check that the correct "File not found error" comes up as you press each selection (the programs you call should *not* be on the disk you have in the drive). If necessary edit and save again to disk.

Saving the Menu as a .COM File

Boot the disk again and run BASIC.COM. Load "MENU1" into BASIC program storage area.

Now load the 'shell' program by typing: LOADM "M4352" 4352 ⟨CR⟩. The 4352 in the filename is so you don't forget to put it in for the load address! The shell loads at 1100H – out of the way of your BASIC MENU1 program.

Enter Monitor via |RESET| and |M|, then type: M 0 5B00 1000 ⟨CR⟩, which moves BASIC scratch *and* the MENU1 program to the end of the shell file.

Type: M 1100 100 5A00 ⟨CR⟩ to move the merged parts to 100H in preparation for a CP/M save. Return to CP/M by: G 0 ⟨CR⟩, and save the file by: SAVE 90 MENU.COM ⟨CR⟩ (90 blocks long).

Set up the Menu-driven Disk

It's best to now use a blank disk and copy to it the MENU.COM program and all programs listed on the selection menu. Note that BASIC.COM is not required, as that is within the MENU.COM file. CONFIG the disk to auto-boot MENU.COM.

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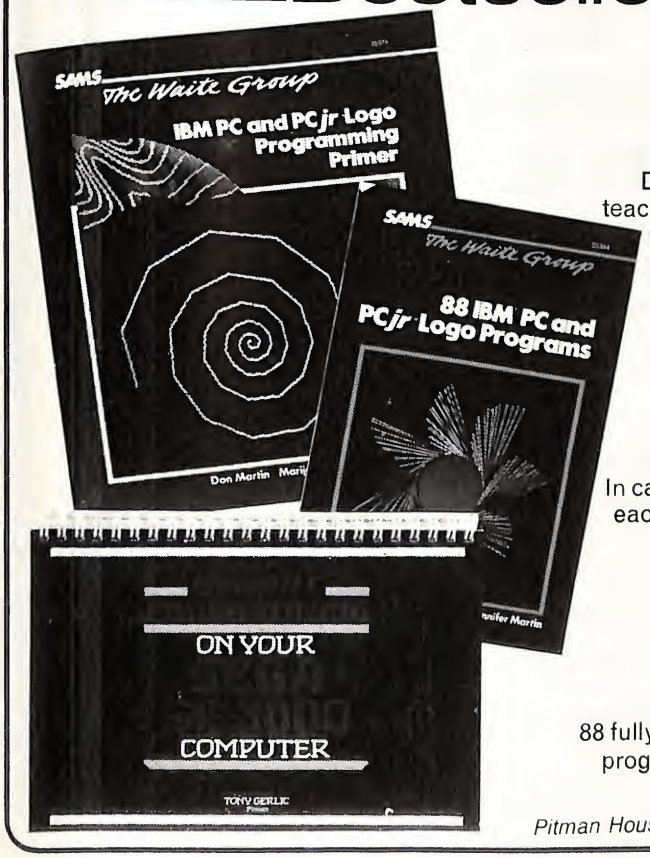

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MICROBEE'S PC85

BY EVAN McHUGH

To coincide with the 1985 Personal Computer show, Applied Technology has released a new entry-level machine. It's called the Microbee PC85 and features a high level of user friendliness – you can even push a button instead of issuing a command.

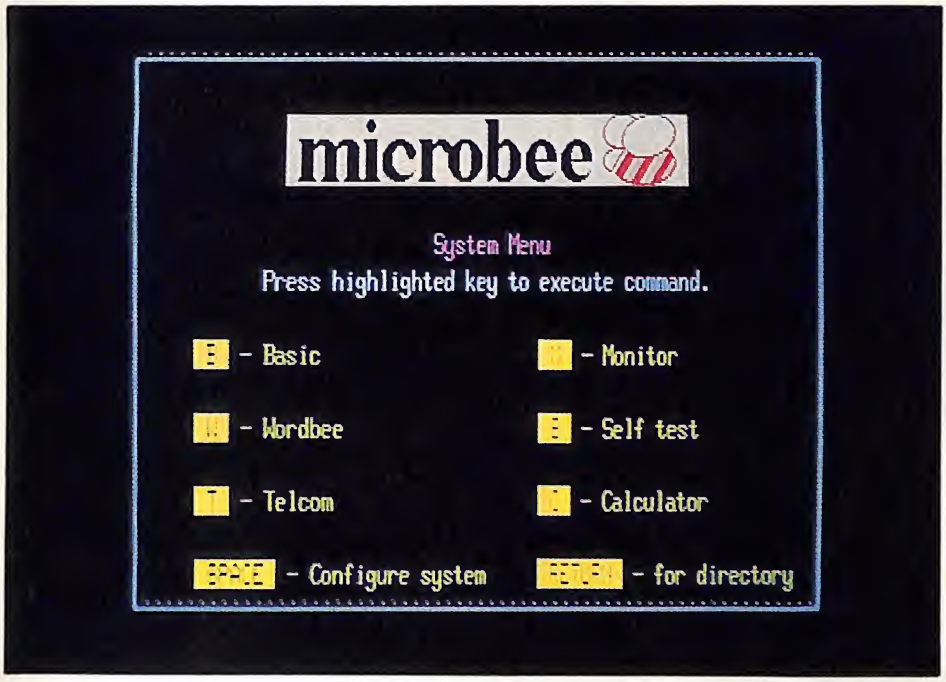
AS AN ADVANCE on the old Microbee, three new screens provide menus that run a selection of standard Microbee packages such as Telcom, Wordbee, Monitor or BASIC, as well as additional packages that make it easier to set up the machine's configuration, test for faults and perform simple calculations. The new screens let you change options or select the facility you wish to use with a push of one or two keys. All the possible options that can be executed at that stage are displayed – a great help to first-time users, who are often at a loss as to what they should do next.

Reliance on tapes has been reduced with the use of ROM packs; up to three of these can be installed by the user on top of the original five that come with the system. Packages available in ROM include Logo, an editor/assembler, Forth, Pascal, a typing tutor, a small database and a spreadsheet.

Some of the new facilities offered in the built-in ROM include the simple calculator, setup and test. The calculator has the basic mathematical functions (+, -, x, /) and scientific notation. It scrolls down the screen like a paper-fed calculator, allowing calculations against the previous total or fresh calculation.

The system configuration option lets you adjust the position of the screen, select the default printer device (Telcom serial, serial or parallel), adjust the foreground and background colour and its intensity, and set the clock and alarm. The clock is battery-backed with a nickel cadmium battery that recharges itself from the computer's power supply. The alarm gives off a high-pitched chirp from the Microbee's speaker when activated.

The self-test facility checks out the status of the keyboard, memory, the screen, and ports.



Specifications

The specifications for the machine are 32 Kbytes of RAM and 52 Kbytes of ROM. The ROM consists of Microworld BASIC, Wordbee, Telcom, PC85 shell and utilities. There are also 4 Kbytes of screen RAM.

The basic machine gives a monochrome display, but it is possible to get a colour option for an extra $100. This gives a good, steady picture with only marginal blur and reasonable resolution, and a display of 64 characters by 16 lines.

The base price for the PC85 is $499; with a green monitor included it is $599, or $609 with an amber monitor. A PC85 with colour option is $599, but a price for the colour monitor hadn't been announced when we went to print. The PC85 will be available through all normal Microbee outlets. □

◁ *The initial screen on the new Bee lets you select the ROM routines.*

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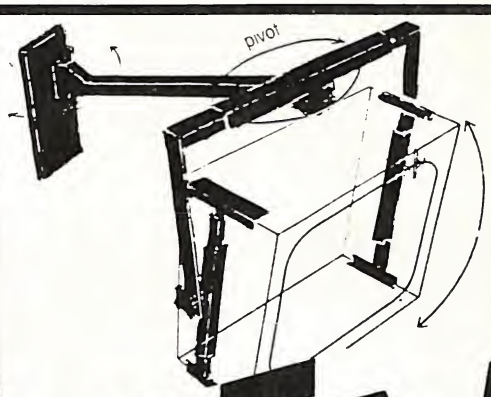

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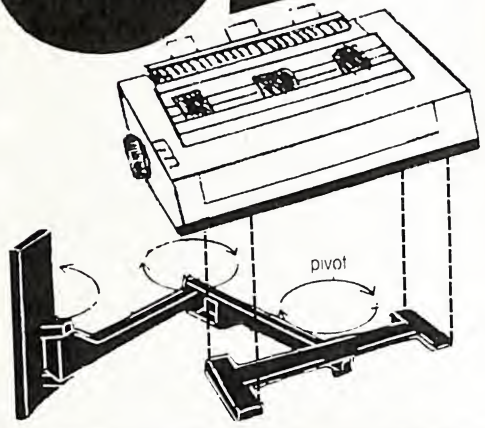

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ON PAGES 203-4 of that most indispensable of tomes, the BBC *User Guide*, there is a list of negative numbers to use with the ADVAL function. If everyone normally uses ADVAL(n) (with n between 0 and 4) to find out where their joysticks are pointing or how many volts from The Outside World are hanging across the analogue-digital converters, the use of negative numbers may imply something introspective?

Right again! Using values between -1 and -9, the ADVAL function can supply a wealth of information about the Beeb's digestive system. How many bytes of the keyboard has it taken? ADVAL(-1) returns the number of characters typed into the keyboard buffer. At the other end of things, ADVAL(-3) will tell how much free space is left on the RS423 output buffer. Values between -5 and -8 return the free space in each of the sound buffers, and so on.

It seems pertinent to go peering into internal mysteries such as sound channel buffers – and I've never had the slightest urge to do so – but the day I bought a printer I certainly found a use for the ADVAL(-4) function. Being absent-minded (a polite term for incompetent), I kept forgetting to turn it on, resulting in many perplexing long waits. Even more distressing were several programs asking "Is a printer connected?", or telling me to "Press any key" when it was. There's no need for such unimaginative programming on this machine, thanks to ADVAL. Try the following function, which returns TRUE when a printer is connected to the parallel port (and online) and FALSE when one isn't.

```
1000 DEF FNprinter
1010 LOCAL a : REM First flush the printer buffer.
1020 *FX21,3
1030 REM See how much room there is in the buffer:
1040 aADVAL(-4)
1050 REM Send a few harmless characters to the printer:
1060 VDU 2,1,27,1,7,3
1070 REM
```

Now look at what's in the buffer.

```
1080 IF ADVAL(-4)a THEN FALSE ELSE TRUE
```

This simple loop can use FNprinter to test for the existence of a printer.

```
200 REPEAT
210 PRINT TAB(0,0); "Turn on the printer.";
220 UNTIL FNprinter TRUE
230 CLS
```

Bigger Beebs

Second processors are turning up everywhere these days; I even saw one lying around the *Your Computer* office. The 6502 3 MHz model costs around $500 and the Z80 unit comes with CP/M software for around $900. Both have 64 Kbytes of RAM. With Acorn's acquisition of Torch Computers there's now the vision of a 68000 with 256 Kbytes of memory, UNIX and 20 Mbyte hard disk to dream about. At around 2900 pounds in the UK that's all most BBC owners will be able to do.

EVAL Can do More Than Evaluate

Did you know EVAL can recognise predefined variables? If particular responses are expected when entering numerical values, you might choose to allow users to enter words like 'zero', 'Tuesday' or 'Fred', as long as you'd already defined each word as a number. Try this:

```
10 REM Using EVAL to look intelligent:
20 one1:two2:three3
30 FOR N1 TO 3
40 PRINT "How do you spell ";N;
50 INPUT number$
60 IF EVAL(number$)N THEN PRINT "Correct."" ELSE PRINT "Wrong.""
70 NEXT
80 END
```

I hasten to point out that this is not an educational program! An error trap for ERR number 26 "No such variable" would be essential when using the function in this way.

Books

Being of the belief that imitation and adaptation are reasonably effective ways to learn programming, I was pleased to see that BBC *Programs Volume* 1 by Carl Graham and Nick Hampshire (published by Duckworth) contained a couple of dozen games, utilities and applications suitable for modification and simple changes.

While not specifically written for this purpose, several of the programs use more advanced techniques like recursion and operating system calls, so examples are there for those who have progressed beyond introductory programming yet are still awed by the many mysteries of the Beeb. I do wish the authors had known about the LISTO command when they were printing the programs; unindented listings are unforgivable in this kind of book.

Word Processors for Writing BASIC

Although the cursor-based editor on the Beeb is very easy to use when writing BASIC programs, I've often wanted to do global alterations of variable names in long programs, or to search for this or that. One solution is to buy one of the utility ROMs which allow this sort of activity. Another is to use a word processor to type the program as a text file with no line numbers and no formatting details apart from carriage returns.

Make the first line of this text file AUTO, so that after saving the file you can switch to BASIC and run *EXEC on it. The result is a BASIC program which can then be saved (under a different name from the text file, of course). When you wish to make changes, alter the text file and *EXEC it again; this way you retain the ability to make use of the word processor's features. Figure 1 is an example.

Structured programming zealots should be delirious with joy over this technique. Thanks to the complexity of the method the interpreter uses to code line numbers, you can't use GOTO or GOSUB□

```
Text file:              AUTO
                        MODE 3
                        FOR N%=1 TO 10
                        PRINT N%
                        NEXT

Save this file as "TEST".

                        After *EXEC TEST you will have:
                        10 MODE 3
                        20 FOR N%=1 TO 10
                        30 PRINT N%
                        40 NEXT

                        Save this file as "TEST.B".
```

Figure 1.

North Star's Dimension.

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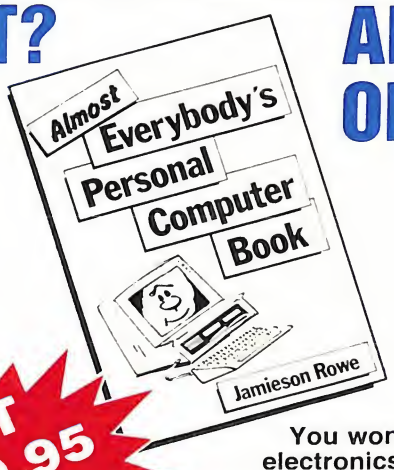

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WELCOME TO THE first TI column for 1985. I hope the festive season was pleasant for you and that your new year will bring many enjoyable hours of computing.

Many of you would have made more use of your 4A than usual over the holiday period, and are probably wanting to move on to some advanced programming. So in this month's column I am going to share with you the latest news concerning the 4A and its peripherals (both software and hardware), our local users' group bulletin board service, and a whole swag of books.

Software News

Software available for the 4A has increased rapidly over the last half year and there are a number of items worthy of further investigation. Now on disk (if you have 32K extra memory) you can get 'XB-Chess', a very popular and well-written game by Andrew Nutting. Or if you're looking for a challenge of a different kind, check out 'Diablo' by Manual Constantinidas. This game combines excellent graphics and smoothly executed sprites to provide many hours of thought-provoking enjoyment. Other titles include 'Rainbow Pyramid', 'Toad' (still one of the best 'Frogger' games around), 'Cosmic Combat', 'Alien War', 'Racer' and 'Backgammon'.

These, and many more, are available on cassette from Computerwave, 325 George Street, Sydney, for $15-$18 each. If you live interstate or overseas, mail orders are accepted and Shane tells me he has facilities for Mastercharge, Visa, American Express, Diners' Club and Bankcard.

If cartridge software is more to your liking, try Radio Despatch Services at 869 George Street, Sydney, for a full catalogue. This company also accepts mail and phone orders (ask for Paula Jenkins), and accepts Bankcard and Mastercard. A new shipment of 4A's was received just before Christmas, so if you're looking for one (or would like a second) contact RDS for availability.

Mail Ordering

One mail order house in the US, Tenex Computer Express, recently sent me its 1984 Summer catalogue. Roger Dooley, the company president, writes to say his company is firmly behind the 4A and, having dealt with Tenex in the past, I can assure you of the company's quality and speedy service.

The catalogue contains a host of goodies. Most new game cartridges are $US24.95, with some of the older ones ('Parsec') ranging from $US9.95-$19.95 (excellent value). Moonbeam Software is cassette based and at $US8.95 is well worth buying. I have seen nearly all of these and found them very playable, with 'Cavern Quest' and 'Garbage Belly' being particularly good fun. Another large company supporting the 4A is Parker Brothers, which has converted two popular arcade games – 'Frogger' and 'Q*Bert' for the 4A. The price of each cartridge is $US38.95.

Atarisoft has a full complement of games available at $US21.95-$25.95. Take your pick from 'Ms Pac-Man', 'Pole Position', 'Moon Patrol', 'Jungle Hunt' and eight other titles. 'Spy's Demise', from Challenger Software, is particularly interesting (on cassette or disk) at $US15.95. It is a terrific conversion of the Penguin Software original, with nine screens and eleven floors on each screen.

Educational software from KIDware should be familiar to most 4A users here. The TISHUG shop (open at monthly meetings) has a range of these cassette-based learning games.

New from MicroPal is 'At the Zoo', a fun game for kids aged four and over, which makes extensive use of graphics and speech to teach spelling, geography and general knowledge as it relates to animals you might encounter in the zoo. You will need a TE2 and Speech Synthesiser for this one, and it comes on cassette or disk for $US21.95.

For the family historian there is 'The Genealogy Workshop', also from MicroPal, which allows you to keep family records in database format with the ability to send them to your printer for hard copy. Each family entry can hold 20 children and there is a trace function so you can get a quick overview of each entry. This package requires an extra 32 Kbyte, Extended BASIC, disk and optional printer. It is neatly presented in a three-ring binder for $42.95.

Thinking of extra hardware? CorComp Inc. has its latest expansion units available through Tenex. For example, the 9900 Micro Expansion System consisting of RS232, 32 Kbyte card and a double-sided, double-density controller card (which supports up to four drives and claims to be two to four times faster than the TI equivalent) costs $US329. The 9900 Super System sells for $US439 and includes an RS232 interface with two serial ports and one parallel port, 32 Kbytes, a DSDD controller and slots for one full, or two slimline, drives (at $US189 each).

If any of these items whet your appetite and you would like more details, send a large, self-addressed, stamped envelope to me here at *Your Computer*, together with $3 to cover costs, and I will send you the catalogue with order forms and details on how to order by mail from the States.

Book Reviews

There was once a time, back in the Dark Ages (that's about 18 months in computer time) when I had despaired of ever being able to find a book devoted to the 4A. I would go into the city, look forlornly through the shelves of the large bookshops and computer retailers, and leave without even finding an index reference to my TI.

Well, I am pleased to report that due to the good efforts of the large publishing houses there is now an abundance of well-written, attractively presented books catering for both advanced and first-time 4A users. I have been fortunate enough to receive quite a few of these books for review, courtesy of the people mentioned at the end of the reviews.

To make things manageable I have divided these reviews into five categories. I'll look at the first two this month and the others later. They are: beginners, children, advanced, programs and review.

Beginners Books

First-time 4A users have a selection of 'How to ...' books to choose from. Rodney Zaks' *Your First TI99/4A Program* (Sybex through ANZ, $24.95) is another instalment in an already well-established series of books. It is equal in style and presentation to those previously published for the IBM, Apple, Atari and Commodore 64 computers. Zaks takes a very positive approach to computer literacy. The inside cover carries the words "Yes ... you can!", and this motivation is the springboard for the contents of his book.

There are ten chapters in all, covering BASIC programming, calculations, variables, program design (an excellent chapter) and program coding (flowcharting and debugging). Each chapter is liberally sprinkled with cartoons and concludes with a set of short revision exercises (the solutions to which are printed in the back ▷

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FLASHPRINT!! with FLASHKEY!! is fully documented. We believe it completely changes the world of Wordstar.

pages). 'Practice' and 'experiment' are the key words. An attractively presented and thorough guide to BASIC programming.

Two more books aimed at the learner are Bill Brewer and Jerry Willis's *How To Use the* TI99/4A *Computer* (Dilithium through ANZ, $6.95) and *Get Personal with Your* TI99 by William Manning and Lon Ingalsbe (Dilithium through ANZ, $17.95). It is heartening to see the respective authors avoiding the temptation to simply repeat material contained in the two manuals included with the 4A.

The Brewer and Willis book must qualify as exceptional value for money. I particularly liked the first chapter, entitled 'What do we have here?', in which a brief history of Texas Instruments and its Home Computer is given. The book covers all the 4A's possible uses, from games and education to business (and don't let anyone tell you the 4A can't be used as a small business machine – just quote the TI-Count software packages now available locally for what a good job the TMS9900 processor can do).

Crisp monochrome photographs accompany the text, which is easy to read. The chapter on loading cassette-based programs would certainly solve many of the problems people write to me with, and further chapters cover BASIC programming, using graphics, colour and sound, and guidelines for purchasing software and peripherals.

Get Personal is a larger book aimed at a slightly more advanced user. It would be suitable for those who have absorbed everything from their 4A manuals and wish to use their computer's more advanced features. While still providing the essential background information, the emphasis is on modifying and improving those attempts you made at programming when you first purchased your 4A; the ultimate goal being "to increase your computer literacy."

This book has two distinct sections: the first gives helpful hints on computers, BASIC, and the unique qualities of the 4A; the second (chapters three through 12) covers computer terminology, writing and editing programs, use of sound and colour, string functions and sub-programming. There are six appendices including ASCII codes, colour sets, musical frequencies and built-in numeric functions (ABS, COS, LOG, SQR, RND, and so on)

Short listings serve as demonstrations throughout the text and can be saved to your storage device (DSK1 or CS1)

Also for beginners, I have two unusual books. I say unusual not because the subject matter or the treatment is unusual, but because both authors were once heavily involved in TISHUG's sister group in the UK, TIHome.

Peter Brooks, the author of *Mastering the* TI99 (Micro Press through ANZ, $21.95) was a pioneering member of TIHome in early 1981. Brooks established himself as a knowledgeable writer and programmer for *Tidings* the UK group's newsletter.

Mastering the TI99 is a valuable purchase, if only for the chapter on translating BASIC code between machines. Other chapters discuss file handling, graphics plotting, printing errors, hints and tips – all in Brooks' typically concise style. There are routines for checking memory, using CALL FILES(), and a short program for visually checking tape loading. There are another 28 tips included, and with its highly functional index I would recommend this book for the more 'advanced' beginners among you.

Stephen Shaw continues his involvement with the 4A in his book *Getting Started with the Texas* TI99/4A (Phoenix through ANZ, $19.95). Shaw wrote for *Tidings* as well as conducting a successful import business from his home in Stockport, Cheshire. He was bringing the best American software into England at a time when the majority of British computer magazines, with the exception of perhaps *Computer and Video Games*, was giving little or no coverage to the 4A machine. Texas Instruments' attempts to launch the early model 4 there were abortive, causing many journalists to write it off as a bad joke, and even with the introduction of the more versatile 4A no-one wanted to know it!

With the first-time user in mind, *Getting Started* is a guided tour from setting up and understanding your computer to programming in BASIC and Extended BASIC. (Did you know there are two versions of Extended BASIC? One is the Vn100 and the other, which is more common, is the Vn110. Apparently the latter version is significantly faster, but there is some degree of incompatibility between the two versions with respect to sprite handling and user sub-routines.)

This book, with its encyclopedia-like entries could almost qualify as a dictionary for the 4A. All the listings included have been fully developed and represent excellent examples of the Shaw approach to programming. They equal anything he has published in earlier editions of *Compu-*

ter and Video Games magazine, which, if you haven't guessed, is my favourite English magazine.

Books for Kids

There are three books in this category. Each book's basic content is program orientated: that is, they consist mainly of listings that the kids can practice keying into their 4A's. I have evaluated these books on the quality of the programs and their presentation, since these are about the only criteria that differentiates one from the other.

Thomas A. Thompson's approach to computer graphics, in *Art and Graphics with Your* TI99/4A (Hayden through Holt-Saunders, $20.95) is exemplified by the cover – eye-catching and appealing. Thompson must also be congratulated for providing an actual screen photograph with each listing – you at least know what the product of an hour's typing will look like.

There are 25 listings in all, printed at normal size which is an advantage for younger users. Most are either static displays or contain limited animation, and the graphics are of the low-res block type, but this is in keeping with the book's title. For kids getting acquainted with the world of 4A computing I think this would be a good introduction.

Like many early 4 and 4A users I enjoyed reading Fred D'Ignazio's articles in *Compute* magazine, where his relaxed, conversational style of computer journalism made you feel immediately at home with whatever was being discussed or explained. His *TI In Wonderland* and *The TI Playground* (Hayden through Holt-Saunders, $17.50 each) contain between them a total of 43 educational and learning programs aimed mainly at children in the primary years. In fact, quite a few of the listings were coded by students from the author's home town in Virginia.

Each listing is short enough to make keying in easy, even for younger users. The type is larger than normal and hence clearly displayed – no more mixing up zeros with 'O's, or 'B's with eights. There is a note to parents and teachers preceding each listing, followed by a short introduction explaining the object of the program to the students, and all variables are itemised and explained (a commendable practice I am heartened to see most authors have adopted).

Have a closer look at these two books – I feel you won't be disappointed. They are educationally sound and make learning fun.

A last mention in the books category is a handy little thing called the TI99/4A *Quick Key* BASIC *Reference Chart* (Hayden through Holt-Saunders, $4.95) created by Aubrey Jones Jnr, the author of the I *Speak* BASIC *to My* ... series. It is the ideal gift for the avid 4A hacker in your family. Just think, no more thumbing through manuals looking for colour sets, editing commands and error codes. They're all collected here, neatly arranged on a laminated chart that you can place above your computer desk – I'm sure you will refer to it constantly.

If you would like more information or catalogues, the distributors of the above mentioned books can be contacted at the following addresses:

Maureen Murphy, Holt-Saunders, 9 Waltham Street, Artarmon 2064; (02) 439 3633.

Sandra Gorman, William Collins, 55 Clarence Street, Sydney 2000; (02) 439 2066.

Shirley Malcolm, ANZ Book Co., 10 Aquatic Drive, Frenchs Forest 2086; (02) 452 4411.

TISHUG BBS

Finally, let me bring you up to date with the TISHUG Bulletin Board. Over the past three months those of us with modems and communications software have enjoyed accessing all the latest news and club software on the bulletin board.

Originally, the idea came from Shane Andersen, the club founder and intrepid *Sydney News Digest* editor. He organised the software (written by Robert Crago, a club member) through a competition and set up the service with himself as SYSOP (SYStem OPerator). Shane has a fair amount of experience when it comes to communications – he was originally involved with amateur radio and has used his extensive knowledge to make the BBS a successful operation (I am sure everyone who uses the system would agree on that point). It is constantly being updated with new features (including speech) and, except for a few 'bugs' early on, has continued to function quite smoothly.

To make the BBS accessible to everyone, a group of technically-minded club members is working on plug-in modems, which Shane tells me should be in prototype form by the time you read this□

GLOSSARY

A

Accumulator: The major register of a CPU, in which arithmetic and logical functions are performed. Some computers have several registers which can function as accumulators; in others, some registers can perform a subset of the full set of operations.

Acoustic coupler: A device for connecting the telephone handset to data communications equipment.

Address: A memory location which can contain data or an instruction.

AI: Artificial Intelligence.

Algol: Algorithmic Language. An early computer programming language for mathematical applications. Widely used in Europe, it embodied early structured programming concepts and was a precursor of Pascal.

Algorithm: A set of instructions which define a method of obtaining some result (usually mathematical). A cooking recipe is an algorithm, as is a knitting pattern.

Alphanumeric: Composed of letters or numbers or both.

Analogue (Analog): Representation of a value by a voltage or some other measurable datum, rather than a binary or other representation based on counting.

Application: What you do with your computer. For example games, word processing and graphics.

Array: A set of values under a common variable name, accessed through a subscript. For example A[1]is the first item in array A, A[2]is the second, and so on. A[N]is the Nth item.

ASCII: American Standard Code for Information Interchange; a common system for representing character information.

ASM: Assembler. Also a suffix added to assembly language file names under CP/M to distinguish them from other files with the same name.

Assembler: A program which converts assembly language into its corresponding machine (or object) code, which can be executed by the computer.

Assembly Language: A language in which each machine code instruction is represented by a short mnemonic which is much more comprehensible to the programmer. For example, the 8080 machine code instruction:

10010110 is:

SUBL (subtract contents of register L from accumulator) in assembly language. Each line of assembly language becomes one machine instruction

Assign: To make one thing equal to another; for example, [A=B]assigns the value of B to A.

Attribute: A property possessed by some object, such as a file being read-only.

B

Background Task: In a multi-programming environment, a low-priority program which runs when the processor has nothing else to do.

Backup: An extra copy of a disk, tape or file taken as a precaution against damage of the original.

Bandwidth: The range of frequencies that can be carried by a communications channel.

Base: The lowest number inexpressible as a single digit in a given number system.

BASIC: Beginners All-purpose Symbolic Instruction Code. Invented in 1970 at Dartmouth College by Kemeny and Kurtz as a teaching language, it has since been enhanced in its more exotic forms into one of the most sophisticated yet easy-to-use languages available on personal computers. Its major rival is Pascal, which has the added virtue of stressing structured program design.

Baud: The number of bits transmitted per second along a data communications line.

BCD: Binary Coded Decimal, a 4-bit binary representation of the digits 0 through 9, with two BCD digits usually packed in a byte.

BDOS: Basic Disk Operating System. The major functional component of the CP/M DOS.

Binary: The base 2 system of counting used by digital computers.

Binary Search: A method of searching for an entry in a table by successively halving the table until all that's left is the desired entry.

Binary Tree: A form of data structure in which entries are tagged on at the end of the appropriate branches.

BIOS: Basic Input/Output System. The part of the CP/M operating system which is different for each type of machine and provides any special I/O routines for disks, terminal, printer, and so on.

Bit: Binary digit, being the basic unit of data storage. Either 1 or 0, off or on, true of false.

Block: A physical division of data in a logical record.

Boot: To load the operating system into the computer from a disk or tape, either initially or subsequently after running a program.

Bootstrap: To use one short program to load a longer loader program which then loads the operating system.

Branch Instruction: A program instruction which causes the computer to jump to another instruction.

Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.

Bug: An error in a program. Makes programmers itch.

Bus: A set of wires over which data, addresses, or control signals are transferred between the central processor and memory of I/O devices.

Byte: A computer word eight bits wide. A byte in memory can hold a character or a binary number between zero and 255 (or -128 and 127), or a computer instruction. **C:** A programming language, developed at Bell Labs, which is particularly convenient for writing system utility programs.

C

Call: A jump to a subroutine which leaves the return address on the microprocessor stack, so when the subroutine is finished executing control returns to where it left off.

CBASIC: A commercial version of the BASIC language, running under the CP/M operating system. Doesn't use line numbers on every line, and is compiled, rather than interpreted like Microsoft BASIC.

CCITT: Consultative Committee on International Telegraphy and Telephony. The committee sets standards for various aspects of telephone and telegraph usage.

CCP: Console Command Processor. The part of the CP/M operating system that reads a command line and sorts out what it means.

Chain: To automatically run one program after another.

Character: A letter or number, or in some circumstances a control code such as 'carriage return'.

Checksum: A running total of the characters in a file, recorded or transmitted with the file so that errors can be detected.

COBOL: COmmon Business Oriented Language; a high-level language, mainly used in business applications.

Code: Absolute: Machine instructions which are intended to be loaded and executed in a particular area or memory.

Object. Machine instructions, as distinct from the source code from which it was generated.

Re-entrant: Code which may be called by more than one program at a time.

Relocatable: Code which can be loaded and run anywhere in the computer's memory.

Source code: A program written in assembler, or a high level language such as BASIC, which must then be assembled or compiled to produce the object code which can actually be executed.

Cold Boot: To start up a system from scratch, loading the operating system from disk or tape.

Cold Start: See Cold Boot.

COM file: In CP/M parlance, a command file; that is, a machine code program that can actually be run.

Command: An instruction from the console for the system to do something.

Comment: A note added into a program to help the reader (or programmer) to understand its operation. Does not affect the program's execution in any way.

Compiler: A program which accepts as input a source file written in a high-level language, and produces as output an object file containing the machine instructions which are actually executed.

Concatenate: To join two strings together, one after the other.

Conditional: A test; for example, is X greater than Y:

IF X § Y THEN GOSUB 500 (BASIC)

Conditionals are one of the most powerful features of any computer language.

Configure: To organise the I/O or other aspects of a system.

Console: The keyboard and screen from which the operator controls the computer.

Control characters: Codes which perform functions like acknowledging correct receipt of a message or requesting retransmission of an erroneous message. Control characters are defined as part of the ASCII and similar codes.

CP/M: A disk operating system for 8080- and Z80-based microcomputers. Allows the user to store information and programs in named files, as well as managing disk storage and input/output functions. Other disk operating systems include TRSDOS (on TRS- 80), DOS 3.3 (for Apple) and MSDOS on many 16-bit micros.

CPS: Characters Per Second.

CPU: Central Processing Unit. The part of the computer responsible for fetching, decoding and performing instructions.

Crash: A situation where the system becomes inoperative, due to a hardware or software error

CRT: Cathode Ray Tube Usually refers to the screen of a video terminal.

▷

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D

Daisywheel printer: A high-quality printer which has a print-head in the shape of a daisy

Data: Information to be processed by, or output from, a program.

DBMS: Data Base Management System. A program which manages the systematic storage and retrieval of a centralised data pool.

DDT: Dynamic Debugging Tool. A program that assists the user to find errors in machine code programs.

Debug: To locate and fix errors.

Decimal: Based on ten.

Device: A piece of equipment such as a printer or tape drive which the computer uses

Directory: A list of the programs on a disk (or occasionally tape) together with necessary information, such as length and location.

Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. Is fast compared with tape, particularly when information is not stored sequentially

Disk Drive: The mechanical assembly which rotates the disk and positions the read/write head

DOS: Disk Operating System.

Disk Operating System: A program which operates one or more disk drives automatically and manages the system.

Display: The computer's output device at the console, usually a TV-like display of letters and numbers; sometimes the computer can produce graphics (charts and pictures) on the display.

Distributed system: A system in which information is stored in several computers, peripherals may be shared, but the information storage is decentralised

Dot matrix printer: A printer which creates a text image from a cluster of dots, produces relatively low-quality, high- speed text and graphic output

Double Density: A method of recording twice as much information on a floppy disk, requiring a higher quality recording surface than on a single-density disk

Driver: A program which controls input and output to a device

E

EBCDIC: Extended Binary Coded Decimal Interchange Code, an 8-bit character coding system – IBM's answer to ASCII

ED: An editor program, part of CP/M

Editor: A program which lets you alter and correct source files and other documents.

Error Message: Tells you something went wrong, and sometimes what.

Execute: To run a program; to follow its instructions.

F

FIFO: First in, first out. A technique used in memory management procedures, or a device used in buffering data flow between two asynchronous devices operating at different speeds.

File: A continuous collection of characters (or bytes) saved on a disk or tape for later reloading.

Fixed point: Counting in integers only. Usually limited to small values, and restricted in accuracy, giving rise to ridiculous answers such as 9/5 = 1.

Flag: A variable, sometimes a single bit, which can have only two values and is used to indicate some condition.

Floating Point: The kind of arithmetic used in scientific calculators.

Floppy disk: A disk, made of thin, flexible mylar, and enclosed in a card jacket, which can be used for magnetic storage. There are three varieties, 9 cm, 13 cm and 20 cm. These can typically store somewhere between 140,000 and three million bytes (characters).

Flowchart: Symbolic representation of the sequence of instructions in a program.

Focal: Formula Calculator. A simple language rather like a small BASIC, found on some mini and microcomputers.

FORTRAN: Formula Translation. One of the first computer languages, and beginning to show it, although still the king of the scientific or number crunching languages.

Function: A sub-program that processes variables in some well-defined way.

G

Garbage Collection: The process of going through memory or disk space, reclaiming all the redundant used space

Gigabyte: One thousand megabytes (1,024,000,000 bytes)

Glitch: A pulse of electronic 'noise' which may cause a system failure

Global: A variable which is known to all the parts of a program. See local

H

Handshaking: A technique for controlling data communication between two devices; data flow only occurs when the receiving device sends a signal indicating it is ready to receive.

Hard disk: A disk made of hard material, which is larger, faster and more fragile than a floppy disk, but capable of storing 70 million bytes or more.

Hard Copy: Printout.

Hardware: The bits of a computer you can kick, as opposed to the programs you can only swear it.

Hashing: A method of reducing the size of a table which otherwise would have mostly empty entries.

Hexadecimal: The method of counting to the base sixteen or the method of splitting binary digits into groups of four, which is the same thing. In hex, you count: 0 1 2 3 4 5 6 7 8 9 A B C D E F 10 11 12 13 14 15 16 17 18 19 1A 1B 1C 1D 1F 20 21 22

I

IC: Integrated Circuit.

Identifier: A label, or the name of a variable.

Index: A variable which usually points to an entry in a table or list.

Index Register: A processor register which is used to access tables and lists in memory.

Indirect Addressing: Referring to a variable which actually contains the address of another variable.

Inkjet printer: A device which prints by eletrostatically aiming a jet of ink onto the paper

Input: To get data into the computer.

Instruction: A step the computer can perform.

Instruction set: The range of commands which can be performed by a particular processor.

Integer: A whole number.

Integrated Circuit: A circuit built on a single chip of silicon.

Interface: The (hardware or software) connection between any two devices.

Intermediate Code: A special kind of object code which cannot be run directly on the computer, but must be interpreted

Interpreter: A program which examines source code a line at a time, decides what it means, and then does it. Compare with compiler

Interrupt: To electronically drag the computer away from what it is doing in order to respond to some time-critical situation

I/O: Input/Output.

I/O-bound: A process in which the performance speed is limited by the speed of input/output

Jump Instruction: Normally, control proceeds from one instruction to the next, one after the other. A jump instruction passes control, not to the following instruction, but to some other. Jumps can be conditional.

K

Kilo-: Prefix meaning one thousand.

Kilobyte: 1024 bytes (Kbyte).

Kilobaud: 1000 baud (Kbaud).

L

Label: A word which identifies the destination of a call or jump instruction, or simply identifies some location in memory.

LAN: Local Area Network.

Language: The set of instructions, and rules for stringing them together, which you use to instruct the computer what to do.

Laser printer: A printer which works a bit like a photo- copier, but uses a laser to draw an image directly onto the printing drum.

LCD: Liquid Crystal Display.

Library: A set of programs, or subprograms that can be called from your program so you don't have to waste space with a block of commonly used code, for example, a date routine can be held in a library

LIFO: Last In, First Out. A device or data structure in which the most recent item stored is the first available for retrieval. A stack is a LIFO.

Line Number: A number at the beginning of a line, which identifies it in a similar way to a label.

Line Printer: A high-speed printer for computer output.

Link: Part of a data item in a list, which tells the computer the location of the next data item

LISP: LISt Processor. A language much favoured by the artificial intelligence community.

List: A sequence of consecutive data items.

Load: To transfer some data or program into the computer memory

Locate: To 'fix' a relocatable code so it will only run if loaded in a particular location

Local Area Network: A system of inter-connected computers, within a limited geographical space (usually in a single building)

Logical Device: A device as the computer 'sees' it: what the computer regards as the 'list device' may be one of several 'physical devices', such as a line printer or teletype

Loop: To repeatedly execute a sequence of instructions; part of a computer program that is so executed.

M

Machine Language: The binary codes the machine actually executes.
Macro: A user-defined sequence of instructions which can be inserted anywhere in a program. See Library.
Macro-assembler: An assembler which can utilise macros.
MBASIC: Microsoft BASIC, the BASIC used in the TRS-80, PET, Apple II and so on.
Megabyte: One thousand kilobytes – 1,024,000 bytes (Mbyte)
Memory: Where the computer stores data and programs internally for fast access.
Menu: A display which offers the operator a choice of alternatives.
Microcomputer: A small computer based on a microprocessor.
Micro-floppy: A 9 cm 'floppy' disk, produced with a rigid plastic case.
Microprocessor: The central processing unit of a computer, built into a single silicon chip.
Millisecond: One thousandth of a second.
Mini-diskette: A 13 cm floppy disk.
MIPS: Million Instructions Per Second. A measure of processor speed.
Modem: Modulator/Demodulator. Device used to link a computer to the telephone line. It encodes digital bits into frequencies, and vice-versa.
MOS: Metal Oxide Semiconductor. Technology used for manufacturing high-density semi-conductors. CMOS (complementary MOS) technology is characterised by low energy consumption, and is increasingly used in portable computers.
Mouse: A device connected to a computer which, when moved around on a desk, moves a pointer on the computer screen.
MP/M: A multi-user version of CP/M.
Multiplexer: Device used to divide a communications line among a number of users.

N

Nanosecond One billionth (.000000001) of a second
Nibble: Half a byte (4 bits)
Node: A connection point on a network.
Network: A system of inter-connected computers.

O

Object code: Machine code.
Object file: A file containing object code.
Object module: An object file containing part of a program, ready to be linked to others. **Octal:** The system of counting to base eight, or grouping bits in threes.
Offset: To give the operating system the characteristics of a file so that it can subsequently read or write it.
Operand: The number an operator (+, -, and so on) operates on.
Operator: An arithmetic function or some other function which alters variables.
Optic fibres: Cables made from thin fibres of glass (or similar material). Signals are encoded as light and transmitted along the cables.
Optimisation: Making a program work better (or faster, or using less memory).
Output: What the system produces.
Overlay: A technique for efficient use of memory space, in which different routines use the same memory locations. Routines using the same area are held in a backup store, and transferred into memory when needed.

P

Packed Data: Data which shares the same address, and has to be unpacked before use.
Packet switching: A system of communicating data by dividing it into small packets addressed to particular receivers.
Page: A length of memory, typically 256 bytes.
Parallel transmission: A method of moving data so that all elements of a compound unit are sent simultaneously. For example, the eight bits in a byte may be sent at the same time by using eight channels. This is the method used within the computer, and with some printers. Fast and expensive.
Parameter: A constant which sometimes has to be varied
Parity: An extra bit on the end of a character or byte for error detection.
Pascal: A modern structured language which may eventually rival BASIC in popularity for microcomputers
Password: A secret word the system may demand of you before allowing you access to certain (or all) programs or data.
Patch: A temporary (ha, ha) fix on a bug
Peripheral: A piece of equipment the computer uses, like a printer, disk drive, or modem.
Physical device: See Logical Device.
Picosecond: One trillionth (.000000000001) of a second.
PIP: Peripheral Interchange Program. A CP/M utility for copying files between devices.
PL/I: Programming Language One. A good general purpose commercial language.
Pointer: A variable used for indirect addressing.
Polish notation: A method of separating operators and operands; for example, + 5 4 is Polish notation for 4 + 5.
Poll: To ask a peripheral if it requires service. For example, a processor will regularly check a terminal to see if it has output ready to be processed.
Port: A physical input/output connection point.
Postfix notation: Also known as Reverse Polish Notation, this is similar to Polish; + 4 5 means 4 + 5.
Preprocessor: A program which does part of a job to make life easier for the program which follows; for example, a macro processor before an assembler.
Priority: The resolution of which interrupt is serviced first if two should arrive at the same time.
Process: A program.
Processor-bound: A process in which the limiting performance factor is the speed at which the processor can perform the required computations.
Program: A sequence of instructions which can be understood, and ultimately followed by a computer.
Prompt: A message asking the operator or user to supply information.
Protocol: The rules governing the exchange of information between two devices.

Q

Queue: A list in which entries are made at one end, and removed from the other.

R

R/O: Read Only; cannot be overwritten.
RAM: Random Access Memory.
Random Access Memory: The computer's internal memory which is used to hold running programs and data. The computer can both write and read RAM.
ROM: Read Only Memory
Read Only Memory: Internal computer memory used to store programs, which cannot be erased or overwritten.
Reader: Paper tape input device.
Read/Write head: The small coil which reads and writes on the surface of a disk.
Real-time: A system in which the processing of data input to the computer takes place virtually simultaneously with the actions which generate the data.
Record: A set of related data items. For example, an employee's name, address, payroll number and pay rate would form a record.
Recursion: The ability of functions in some languages to call themselves.
Re-entrant code: Code which can be used by several programs simultaneously, keeping separate data for each.
Register: A location in the processor capable of performing logical or arithmetic functions on the contents.
Relocatable: Capable of being moved in memory.
Relocatable object module: Part of a larger program consisting of many such modules, all linked together and located.
Resident: Permanently in the system.
Reverse Polish Notation: See Postfix.
RS232: (also RS232C) Registered Standard 232C. A widely used standard for connecting components in a computer system.
Run: To execute a program.

S

S100:FM A popular 100-line microcomputer bus, originally developed for the first 8080-based computer
Save: To store a program on disk or cassette (particularly BASIC).
Screen: See CRT
Sector: A section of data on a disk.
Serial transmission: Movement of data one bit at a time. One byte will be sent as eight bits, one following the other. Cheap and slow
Simulation: Making one system behave like another
Software: Programs
Source code: The original text form of a program.
Source file: A file of source code
Source language: The language the source code is written in; for example, BASIC, Assembler, C
Sort: To arrange items of data in order
Spool: Simultaneous Peripheral Operations Online. A method of outputting information by queuing information for low-speed output devices, while simultaneously continuing other computer operations ▷

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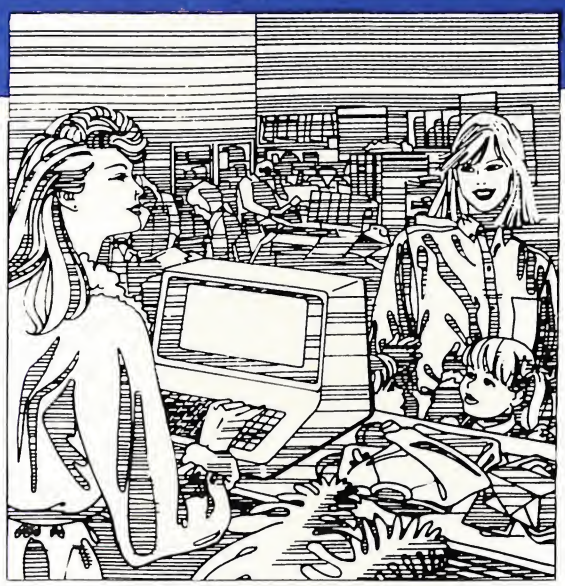

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Stack: A list in which both entries and removals are made at the same end. A microprocessor usually has a hardware stack which is used to save subroutine return addresses, temporary storage of data, and to pass variables between subroutines.
String: A sequence of characters.
Submit: To put the system under control of a file of system commands.
Subroutine: Part of a program which can be accessed from several points within the program.
Symbol: The name of a variable or a location in memory.
Symbol table: A table constructed by an assembler or compiler to give the addresses of all variables and labels in a program.
System: A collection of hardware and software, possessed of the property that the whole is greater than the sum of the parts.
System disk: A disk carrying the operating system.

T

Teletype: An electro-mechanical printer/keyboard.
Terabyte: One thousand gigabytes (1,024,000,000,000 bytes).
Timeshare: Running several programs on a system simultaneously.
Track: The area under the read/write head during one rotation of a disk.
Transient: A program that is only in memory for a short time before being overwritten. Often, the only program that is not a transient is the operating system.
Tree: A list in which each data item may refer to several others.
TTY: See Teletype.

U

UART: Universal Asynchronous Receiver/Transmitter. A device which handles the serial-to-parallel and parallel-to-serial conversion of bits in a data message.
Unix: A multi-user, multi-tasking, multi-programming operating system.
Utility: A program of use to most users.

V

Variable: Named quantity that can take on different values.
VDT: Video Display Terminal.
VDU: Video Display Unit.
Verify: To check that data written on a disk or tape can be read again correctly.
Viatel: Telecom Australia's videotext system.
Videotext: Also known as viewdata. A technology which uses slightly modified domestic televisions to access data from a computer database along the telephone lines. Prestel in the UK was the first such system. Australia's version is called Viatel.
Virtual Memory: A technique allowing programs larger than RAM to run. Only part is in memory. Parts are swapped from an online storage device as required.

W

Warm boot: To reload the operating system a second or subsequent time.
Window: A part of a computer screen which has been divided into sections for displaying distinct information. On some systems which run a number of processes at once, each concurrent process may be displayed in its own window.
Word: The amount of data fetched from one memory location. Typically one byte, but can be two on recent processors.
Word processor: A system for manipulating, editing, printing and formatting text files.
WordStar: A proprietary word processing program.
Word wrap: A word processing function which automatically breaks lines exceeding the set right margin limit, and begins placing the words on the next line.
Write protect: To remove the cover from the notch in a 20 cm floppy disk, so it cannot be written on. With 13 cm mini- floppies, the reverse action (that is, covering the notch) will write-protect the disk.

Z

Z80: A popular 8-bit microprocessor.

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Contributions to *Your Computer* are welcomed and will be given every consideration*. Please read these notes carefully to get an idea of the style and format we prefer.

All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

Contributions by Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould – see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

Contributions on Disk: Contributions can be accepted in a wide variety of disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgement. The preferred medium is IBM standard format single-sided, single-density, 20 cm CP/M disks. We can also handle, in-office, Kaypro II and Osborne 13 cm disks, and 13 cm Apple DOS or Apple CP/M disks. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error – if the computer typed it, the computer probably accepted it. Print listings with a dark – preferably new – ribbon on white paper, and try to format the output to a narrow (40-characters) width. If they can't be produced on a printer, borrow a good typewriter – hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

Style: All items should be typed (or printed) and double-spaced on plain white paper. We will only accept original copies – no photostats. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum.

*Although the greatest care will be exercised with contributions, no responsibility can be accepted for the safety or return of any letters, manuscripts, photographs or other materials supplied to *Your Computer* magazine. If return is desired, you should include a stamped, self-addressed envelope. If return is critical – say it's something you can't afford to lose – then don't send it, we *are* careful, but we're not perfect. □

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THE THEME ...

Next month's *Your Computer* will be blue, blue, true blue, blue ribbon, royal blue, deep blue ... see? Because we'll be turning IBM (Big Blue) upside-down and shaking out its pockets, in order to explain to you what the giant is all about – it's not just PCs. It's huge machines, big machines and little machines, all networked together in a choice of ways – we'll *explain* them to you. IBM is people, lots of them, in blue suits – we'll be talking to them till we're blue in the face, about their marketing *strategies*, their plans, what they see out there in the wide blue yonder (will it be?).

On the soft side – powder blue – we'll be looking at *IBM Software Development* in Australia, and at the blue river of packages running out to PC users, both from here and from across the (blue) Pacific.

One staff member has got the blues 'cause she has to provide a comprehensive survey of *All Hardware Add-ons* for the PC.

So you can expect the skies to be blue in May, midnight programmers can howl at a blue moon. At Your Computer our blood will be blue for a month (Dukes and Duchesses all, if you don't mind), as will our stockings and ol' blue eyes, and Matt Whelan will dye his beard and sharpen his knife for the occasion. A blue rinse for computer users Australia-wide might also be in order. Washing powder with anything but blue beads of bleach will be considered passe – that should spread a nice blue wash over everything.

And maybe, just maybe, we'll be able to tell you about some nice new baby blues, meaning *New Arrivals*, but don't hold your breath or you know what colour you'll go ...

... ALSO

May – in the first of a three-part expose called *Software On The Cheap* – will tell you about all the software we can unearth that costs less than $25!

And you'll get nearly two magazines for the price of one. We'll have a 32-page bonus insert (pull-out, lift-out, can't-wait-to-tear-out) of *Pocket Programs*, including full source code for LedgerMaster – a compact BASIC accounting program written for commercial distribution but purchased by *YC* instead – and some useful Matt Whelan tried-and true utilities.

And we have a special feature – leading up to a regular column which will uncover the best free programs for you – on *Public Domain Software*; where and how do you get it?

The *Great Database Search* continues. After a brief pause while we sorted out the mass of packages rolling in for review, we're attacking the search with a vengeance. We'll be reviewing at least one database an issue, sometimes more – leading up to a conclusion later in the year which will uncover the best database packages available.

Plus May will incorporate the regular columns; and comprehensive guidelines on what it will take, the qualities you'll have to show, (how many chocolate chip cookies you'll have to buy us) before we'll let you do what you've always wanted to do – write articles for *Your Computer*. We have new guidelines for both features and programs, so you'll have to read this if you're a budding computer writer.

YOU TOO CAN GET THE JUNE BUG

Despite the blue haze, we're looking forward to a bumper (whitewashed) June issue. And, if you're a retailer or distributor, you should be thinking ahead, too. Among other things, we'll be doing a comparison of alternatives to the IBM PC – the clones, lookalikes and workalikes. We know about most of them but you'll have to tell us about yours to be sure it's included.

For the second part of *Software On The Cheap* we want to know about packages which retail for between $25 and $50; and, for the July issue (part three) we need information on software which sells for between $50 and $100.

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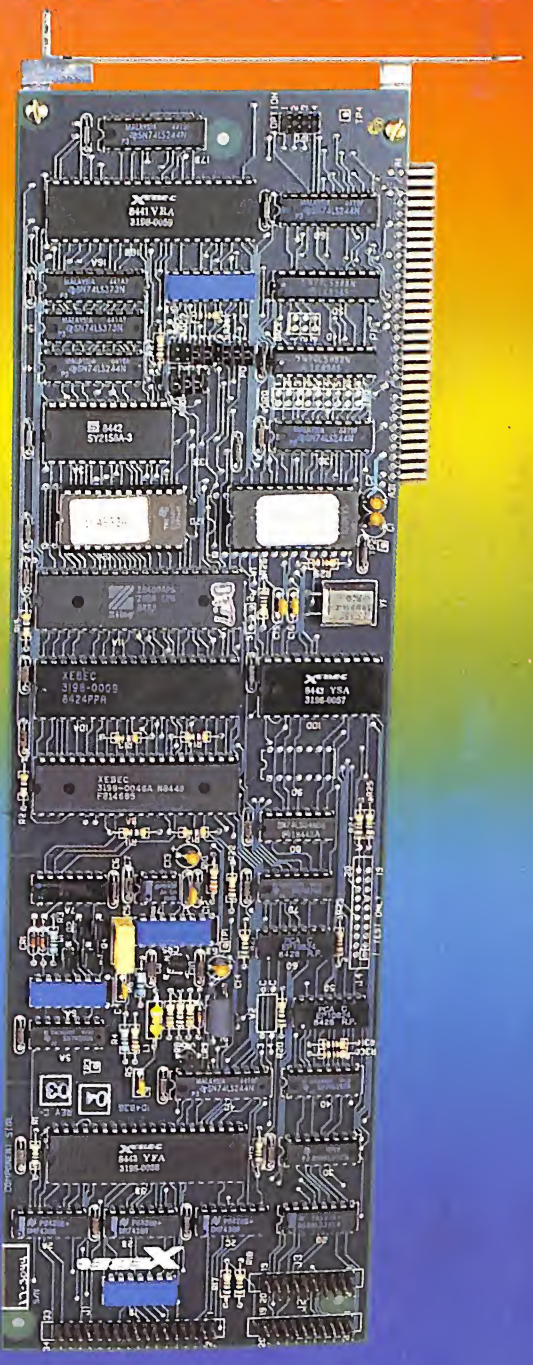

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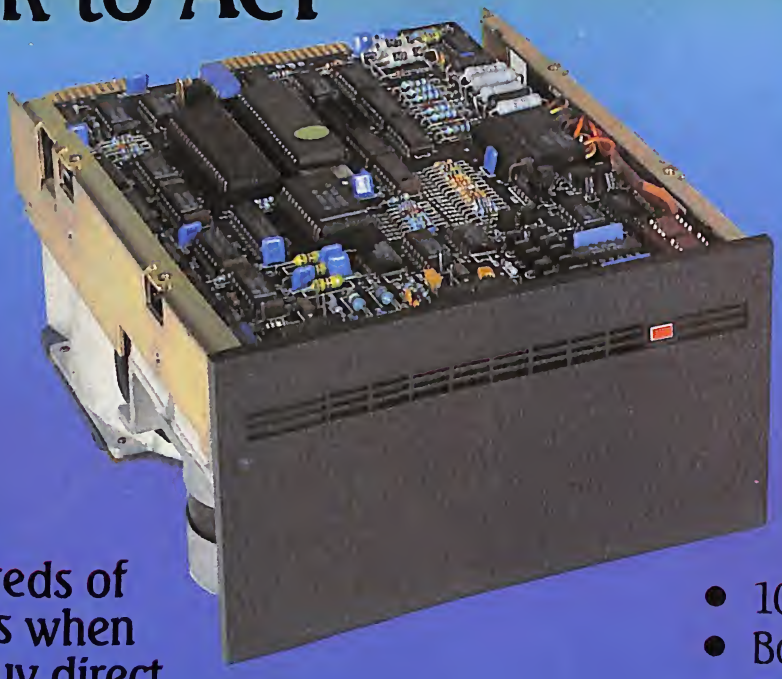

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